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PART I – GENERAL PERMIT CONDITIONS

A. EFFECT OF PERMIT

1. Munitions Treatment Range, Barry M. Goldwater Range - Western Segment, as the Facility operator and owner, hereafter the "Permittee," is allowed to treat hazardous waste at the Facility in accordance with the conditions of this Permit. Any storage, treatment, and/or disposal of hazardous waste at the Facility not authorized in this Permit is prohibited. Subject to Arizona Administrative Code (A.A.C.) R18-8-270.A and 40 Code of Federal Regulations (CFR) 270.4, compliance with this Permit during its term generally constitutes compliance, for purposes of enforcement, with the Arizona Hazardous Waste Management Act (AHWMA), except for those requirements not included in the permit, which: (1) become effective by statute; (2) are promulgated under 40 CFR Part 268 restricting the placement of hazardous wastes in or on the land; (3) are promulgated under 40 CFR Part 264 regarding the leak detection systems described at 40 CFR 270.4(a)(1)(iii); or (4) are promulgated under Subparts AA, BB, or CC of 40 CFR of Part 265 limiting air emissions.

   [A.A.C. R18-8-270.A (40 CFR 270.4)]

2. Issuance of this Permit does not convey any property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of tribal, state or local law or regulations.

   [A.A.C. R18-8-270.A (40 CFR 270.4(b)-(c), 270.30(g))]

3. Compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under Sections 3008(h), 3013, or 7003 of RCRA (42 U.S.C. 6921 et seq.); Sections 104, 106(a) or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et seq., commonly known as CERCLA), or any other law providing for protection of public health or the environment. In addition, compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under Section 3008(a), solely with respect to those requirements set forth at 40 CFR 270.4(a)(1)(i)-(iv).

4. In instances where the Permit and the Approved Permit Application conflict, the Permit takes precedence.

B. DEFINITIONS

For purposes of this Permit, terms used herein shall have the same meaning as those in A.A.C. R18-8-260 et seq. (40 CFR Parts 124, 260 through 273), unless this Permit specifically provides otherwise. Where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

1. A.A.C. and A.R.S. mean the Arizona Administrative Code and the Arizona Revised Statutes, respectively.

2. ADEQ Contact means the hazardous waste permit writer for the Arizona Department of Environmental Quality, Hazardous Waste Permits and Support Unit, whose email address is hazwastepermits@azdeq.gov.

3. AHWMA means the Arizona Hazardous Waste Management Act.

4. Approved Permit Application means the Munitions Treatment Range, Barry M. Goldwater Range - Western Segment, RCRA Part B Permit Application, as received on March 4, 2025 and further information received up through November 21, 2025, including all referenced appendices and documents, reports and workplans.

5. Area of Concern or AOC defined as:

   (a) Hazardous product storage unit or area.

   (b) Any area where a one-time hazardous material (product or waste) spill event occurred.

   (c) Any hazardous material unit or area where management may have occurred, where the potential for release may have existed, but where insufficient evidence was found during the RCRA Facility Assessment (RFA) to verify the existence of a definable Solid Waste Management Unit (SWMU).

6. CFR means the Code of Federal Regulations (as adopted for this permit by the March 31, 2023 supplement of *18 A.A.C. 8, Article 2)* revised as of July 1, 2020.

7. Days mean calendar days, unless otherwise specified.

8. Director means the Director of ADEQ or the Director's designee or authorized representative.

9. Example means, unless otherwise specified, that the form is a blank form that is mandatory to be used or followed. This term does not convey to the Permittee that the statements are optional to be performed or are at the user's discretion. "Example" presents, unless otherwise specified, minimum acceptable.

10. Facility means the Munitions Treatment Range, Barry M. Goldwater Range - Western Segment located at the Marine Corps Air Station in Yuma, Arizona 85369 as depicted on the facility site location map shown in Permit Attachment A (Facility Description), Figure A-1.

11. Hazardous constituent means any constituent identified in A.A.C. R18-8-261.A, Appendix VIII of 40 CFR Part 261.

12. Miscellaneous Unit means a hazardous waste management unit where hazardous waste is treated, stored, or disposed of, is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well, containment building, corrective action management unit, or eligible for research, development, and demonstration Permit.

13. Performance-Oriented packaging (POP) means those containers meeting the performance-oriented packaging standards as defined by the Department of Transportation HM-181 Standards document.

14. Permittee is the person so designated on the Permit Approval Form, signed by the ADEQ Director or the Director's designee.

15. Property Owner is the person so designated on the Permit Approval Form, signed by the ADEQ Director or the Director's designee.

16. Qualified means that the individual or group shall have the same reliability, expertise, integrity, competence, training, education, experience and other necessary skills, as required by this Permit, as the person(s) or group who normally performs that function.

17. QAPP or Quality Assurance Project Plan refers to the plan (or plans) containing the policies and procedures; project organization and objectives; and the quality assurance (QA) requirements and quality control activities designed to achieve the desired type and quality of environmental data necessary to support the project objectives.

18. Regulated Facility or Regulated Unit means any hazardous waste management facility or unit regulated under A.A.C. R18-8-264.A and 270.A, and 40 CFR 264 and 270.

19. Release includes the definitions of "discharge" and "disposal" as found in A.A.C. R18-8-260.A (40 CFR 260.10) and means any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of hazardous wastes (including hazardous constituents) into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous wastes or hazardous constituents) or into secondary containment.

20. RCRA means the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.).

21. Shall, Must, Will, and factual statements denote mandatory requirements.

22. Should or May denotes a recommendation or permission, respectively, which is not mandatory.

23. Solid Waste Management Unit or SWMU means any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. SWMUs include those units defined as "regulated units" under RCRA [see A.A.C. R18-8-264.A (40 CFR 264.90(a)(2))], as well as other units which have generally been exempted from standards applicable to hazardous waste management units, such as recycling units and wastewater treatment units, and areas contaminated by routine, systematic, and deliberate discharges from process areas.

C. PERMIT ACTIONS

1. Permit Modification, Revocation and Reissuance, and Termination

This Permit may be modified, revoked and reissued, or terminated for cause, as specified in A.A.C. R18-8-270.A (40 CFR 270.41 and 270.43). If at any time the Director determines that cause for modification, revocation and reissuance, or termination of the Permit exists under A.A.C. R18-8-270.A (40 CFR 270.41 or 270.43), the Director may initiate a modification to the Permit, revoke and reissue the Permit, or terminate the Permit in accordance with those sections. The initiation of a modification to the Permit, revocation or reissuance of the Permit, or termination of the Permit does not stay the applicability or enforceability of any Permit condition. See Permit Condition I.H.1 for general conditions related to permit modifications.

[A.A.C. R18-8-270.A, 40 CFR 270.41 and 270.43]

2. Modification of the Permit by the Permittee

(a) As set forth at A.A.C. R18-8-270.A (40 CFR 270.42), the Permittee may request a modification of the Permit at any time. The filing of a request for a Permit modification or the notification of planned changes on the part of the Permittee does not stay the applicability or enforceability of any Permit condition. Modifications to the Permit do not constitute a reissuance of the Permit.

(b) In accordance with A.R.S. Title 41, Chapter 6, Article 10, a final determination regarding any Permit Modification (made by the Director is an appealable agency action. Such appeals shall include the appellant's right to request an informal settlement conference (see A.R.S. 41-1092.06).

[A.A.C. R18-8-270.A (40 CFR 270.4(a) and 270.30(f)) and A.R.S. 41-1092 et seq.]

3. Permit Renewal

This Permit may be renewed as specified in A.A.C. R18-8-270.A, 40 CFR 270.30(b) and Permit Condition I.E.3. Review of any application for a Permit renewal shall consider improvements in the state of control and measurement technology, as well as changes in applicable regulations.

[A.A.C. R18-8-270.A (40 CFR 270.30(b)) and RCRA Sec 3005(c)(3)]

D. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or any of the information in the Approved Permit Application that any provision of this Permit may reference, is in any circumstance contested or held invalid, the contested or invalid provision(s) will not affect other Permit provisions that are uncontested and valid. All other provisions of the Permit remain fully effective and enforceable.

[A.A.C. R18-8-271A (40 CFR 124.16(a))]

E. DUTIES AND REQUIREMENTS

1. Duty to Comply

The Permittee must comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an Emergency Permit issued under A.A.C. R18-8-270.A (40 CFR 270.61) or temporary authorization issued under A.A.C. R18-8-270.A (40 CFR 270.42(e)). Any Permit noncompliance, other than noncompliance authorized by an Emergency Permit or temporary authorization, constitutes a violation of AHWMA and/or RCRA and is grounds for enforcement action; for Permit termination, revocation and reissuance, or modification; or for denial of a Permit renewal application.

[A.A.C. R18-8-270.A and 40 CFR 270.30(a)]

2. Duty to Reapply

If the Permittee wishes to continue an activity allowed or required by this Permit after the expiration date of this Permit, the Permittee shall submit a complete application for permit renewal per A.A.C. R18-8-270.A (40 CFR 270.30(b) and 40 CFR 270.10(h)), at least one hundred eighty (180) calendar days before this Permit expires, unless permission for a later date has been granted in writing by the Director.

[A.A.C. R18-8-270.A, 40 CFR 270.10(h), and 270.30(b)]

3. Permit Expiration

This Permit shall be effective for a fixed term not to exceed ten (10) years. This Permit and all conditions herein will remain in effect beyond the Permit's expiration date, if the Permittee has submitted a timely, complete permit application for renewal and through no fault of the Permittee, the Director has not issued a new Permit with an effective date on or before the expiration date of the previous permit. Permits continued under this paragraph remain fully effective and enforceable. For purposes of this requirement a complete application for renewal must be in accordance with requirements of A.A.C. R18-8-270.A, E, F, G, H, I, and J (40 CFR 270.10(h), 270.13 through 270.28)

[A.A.C. R18-8-270.A (40 CFR 270.50(a), 40 CFR 270.51]

4. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the Permitted activity in order to maintain compliance with the conditions of this Permit.

[A.A.C. R18-8-270.A and 40 CFR 270.30(c)]

5. Duty to Mitigate

In the event of noncompliance with this Permit**,** the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures, as are reasonable, to prevent significant adverse impacts on human health or the environment.

[A.A.C. R18-8-270.A and 40 CFR 270.30(d)]

6. Proper Operation and Maintenance

The Permittee must, at all times, properly operate and maintain the Facility and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit.

[A.A.C. R18-8-270.A and 40 CFR 270.30(e)]

7. Duty to Provide Information

The Permittee must furnish to the Director, within a reasonable time, any relevant information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this Permit.

[A.A.C. R18-8-264.A and 270.A, and 40 CFR 264.74(a) and 270.30(h)]

8. Inspection and Entry

Permittee must allow the Director, or an authorized representative, upon the presentation of credentials and other documents, as maybe required by law, to:

(a) Enter at reasonable times upon the Facility and/or the Permittee's premises where a regulated activity is located or conducted, or where records must be kept under the conditions of this Permit;

(b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;

(c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

(d) Sample or monitor, at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by AHWMA and RCRA, any substances or parameters at any location.

[A.A.C. R18-8-270.A (40 CFR 270.30(i))]

Notwithstanding any provision of this Permit, the Director retains the inspection and access authority which the EPA has under RCRA and other applicable laws.

9. Monitoring and Records

(a) Samples and measurements taken by the Permittee for the purpose of monitoring must be representative of the monitored activity.

[A.A.C. R18-8-270.A (40 CFR 270.30(j)(1))]

(i) The sampling and analytical methods employed by the Permittee must be appropriate to achieve the applicable data quality objectives established by the Waste Analysis Plan and the Quality Assurance Project Plan in the Approved Permit Application. The Permittee shall use the sampling and analysis methods that are referenced in the RCRA regulations, where required. The Permittee shall use representative sampling methods consistent with the most appropriate method from A.A.C. R18-8-261.A, Appendix I of 40 CFR Part 261 and as identified in the Waste Analysis Plan (Permit Attachment B), or an equivalent or better method approved by the Director.

(ii) The Permittee must use the procedures identified in the most recent version of the EPA and/or state approved policies and guidance procedures, or an equivalent method approved by the Director for collecting, shipping, analyzing, tracking and controlling samples.

[A.A.C. R18-8-270.A (40 CFR 270.31)]

(iii) All hazardous waste analyses must be performed by in-state or out-of-state laboratories that are certified by the Arizona Department of Health Services for the selected method and each specific analyte for which the analysis is performed pursuant to *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, EPA Publication SW-846 (current edition), or an equivalent or better method, as specified in the Waste Analysis Plan (Permit Attachment B); or as approved by the Director.

[A.R.S. 36-495.01]

(b) The Permittee must retain records of all monitoring information required by this Permit (including all calibration and maintenance records and a record of all monitored measurements, data packages including but not limited to digital and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports and records required by this Permit, the certification required by A.A.C. R-18-264.A and 40 CFR 264.73(b)(9), and records of all data used to complete the application for this Permit for a period of at least three (3) years from the date of the sample, measurement, report, record, certification, or application. These periods may be extended by request of the Director at any time and are automatically extended during the course of any unresolved enforcement action regarding this Facility. The Permittee must maintain records for all groundwater monitoring wells and associated groundwater surface elevations for the active life of the Facility.

[A.A.C. R18-8-264.A and 270.A (40 CFR 264.74(b) and 270.30(j)(2))]

(c) Records of monitoring information must specify, to the extent applicable:

(i) The dates, exact locations, and times of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) The date(s) analyses were performed;

(iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The results of such analyses.

[A.A.C. R18-8-270.A (40 CFR 270.30(j)(3)]

(d) If a contract laboratory is used to perform analyses, the Permittee shall inform the laboratory in writing that it must operate under the conditions set forth in this Permit. For notification and certification verification purposes, a copy of that letter must be included with the final analytical report. In addition, the Permittee shall maintain documentation showing the resolution of any inconsistency between the laboratory's proposed services and the applicable conditions of this Permit.

F. CONFIDENTIAL INFORMATION

In accordance with A.A.C. R18-8-260.D, the Permittee may claim information to be submitted by this Permit as entitled to confidential treatment at the time of submittal. If the Permittee asserts such a claim, the information will be treated in accordance with the procedures in A.A.C. R18-8-260.D(2)(d) and (e). If no claim is made at the time of submission, the information may be made available to the public without further notice.

[A.A.C. R18-8-270.A and H (40 CFR Part 2 and 40 CFR 270.12)]

G. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

1 In addition to the Permit, Approved Permit Application and any modifications thereof during the term of the Permit, the Permittee shall maintain at the facility or at an approved location identified in the Approved Permit Application, until closure is completed and certified by a qualified, Arizona Registered Professional Engineer (P.E.), the current/updated version of the following documents and all amendments, revisions, and modifications to these documents, at a minimum:

(a) Waste Analysis Plan, as required by A.A.C. R18-8-264.A, 40 CFR 264.13 and this Permit;

(b) Inspection schedules, as required by A.A.C. R18-8-264.A, 40 CFR 264.15(b)(2) and this Permit;

(c) Personnel training documents and records, as required by A.A.C. R18-8-264.A, 40 CFR 264.16(d) and this Permit, although training records on current personnel must be kept until closure of the Facility, training records on former employees must be kept for at least three (3) years from the date the employee last worked at the Facility in accordance with 40 CFR 264.16(e);

(d) Contingency Plan, as required by A.A.C. R18-8-264.A, 40 CFR 264.53(a) and this Permit;

(e) Operating record, as required by A.A.C. R18-8-264.A, 40 CFR 264.73 and this Permit;

(f) Closure Plan, as required by A.A.C. R18-8-264.A, 40 CFR 264.112(a) and this Permit;

(g) Documents implementing Corrective Action for Solid Waste Management Units at the Facility as required by A.A.C. R18-8-264.A, 40 CFR 264.101 and this Permit, including, as required, RCRA Facility Assessments, RCRA Facility Investigations, Corrective Measures Studies, Remedy Selection Documents, and others as specified in the Permit;

(h) A copy of the current completeness determination and current approved Permit Application including all appendices and attachments;

(i) All other documents required by Permit Condition I.E.9 (Monitoring and Records).

(j) All other documents required to be maintained for the active life of the Facility in accordance with the requirements of this Permit.

2 For the purposes of the requirement that records be maintained "at the Facility or at an approved location identified in the Approved Permit Application" in accordance with this Permit condition, such records must be maintained at the Facility in electronic format, and be readily accessible to ADEQ for the period that applies to the record. The Contingency Plan must also be available at the Facility in hardcopy. Nothing precludes the other records and documents listed under Permit Condition I.G.1 from being maintained in hardcopy as well.

3 All records, including plans, required under this Permit must be furnished upon request, and made available at all reasonable times for inspection by any officer, employee, or representative of ADEQ who is duly designated by the Director.

H. PERMIT MODIFICATIONS

1. General Conditions

For Permit modifications (including re-applications), the Permittee shall follow A.A.C. R18-8-270.A and 40 CFR 270.42 and as applicable:

(a) Permit Condition I.C.1 (Permit Modification, Revocation, Reissuance, and Termination);

(b) Permit Condition I.I.2 (Reporting Requirements – Anticipated Noncompliance);

(c) Permit Condition I.I.1 (Reporting Requirements – Planned Changes);

(d) Permit Condition II.A (Design and Operation of Facility);

(e) Signatory and document certification requirements as described in Permit Condition I.J (Signatory and Certification Requirements);

(f) Confidentiality rules, if desired, pursuant to Permit Condition I.F. (Confidential Information); and

(g) Fees required to be submitted with the application for Permit modification as required by A.A.C. R18-8-270.G.

2. Facility Mailing List

The Permittee shall obtain (from the ADEQ Contact) and use an updated current facility mailing list, pursuant to A.A.C. R18-8-270.A, 271.I and 40 CFR 270.42 when processing all Permittee requested Permit modifications.

[A.R.S. 49-941, A.A.C. R18-8-270.A, 271.I(c), and 40 CFR 270.42]

3. Changes to Key Employee(s)

For the following key personnel changes, the Permittee shall submit to the ADEQ Contact an ADEQ Character/Background Reference Form:

(a) Training Director – See Permit Attachment G (Personnel Training);

(b) Signatories – See Permit Condition I.J (Signatory and Certification Requirements);

(c) Emergency Coordinators – See Permit Attachment F (Contingency Plan).

[A.R.S. 49-922.C; (270.14(b)(20))]

4. Changes to Contingency Plan

Permittee shall comply with any additional notification requirements resulting from modifications to the Contingency Plan (Permit Attachment F) under A.A.C. R18-8-264.A (40 CFR 264.37(a)(1) and (4)).

[A.A.C. R18-8-264.A (40 CFR 264.37(a)(1) and (4))]

I. REPORTING REQUIREMENTS

1. Reporting Planned Changes

Except as otherwise provided under A.A.C. R18-8-270.A (40 CFR 270.42), the Permittee must give 30 days advance notice to the Director in writing, of any planned physical alterations or additions to the permitted Facility. Any notice provided under this section must include any necessary request for a permit modification pursuant to A.A.C. R18-8-270.A (40 CFR 270.42). The Permittee shall not commence modifications or physical alterations or additions prior to receiving a permit modification.

[A.A.C. R18-8-270.A and 270.L (40 CFR 270.30(l)(1))]

2. Reporting Anticipated Noncompliance

The Permittee must give 30 days advance notice to the Director of any planned changes in the permitted Facility or activity which may result in noncompliance with Permit requirements. For a new Facility, the Permittee may not treat, store, or dispose of hazardous waste; and for a Facility being modified, the Permittee may not treat, store, or dispose of hazardous waste in the modified portion of the Facility except as provided in A.A.C. R18-8-270.A (40 CFR 270.42) until the Permittee and a registered professional engineer certify the modification has been done in compliance with the Permit and the Director has inspected and determined the modification is compliant with the Permit or has waived inspection in accordance with A.A.C. R18-8-270.A (40 CFR 270.30(l)(2)).

[A.A.C. R18-8-270.A and 270.L (40 CFR 270.30(l)(2))]

3. Transfer of Permits

This Permit is not transferable to any person or any other corporation, except after notice to the Director and approval as follows:

(a) The Permittee shall inform the Director in writing and obtain prior written approval from the Director before transferring ownership or operational control of the Facility.

(b) Before transferring ownership or operation of the Facility during its operating life, the Permittee must notify the new owner or operator in writing of the requirements of A.A.C. R18-8-264.A and 270.A (40 CFR Parts 264 and 270) and this Permit.

(c) The Permittee must inform the new owner or operator that they must submit a revised permit application no later than 90 days prior to the scheduled change.

(d) A written agreement containing the specific date for transfer of the Permit responsibility to the new Permittee must also be submitted to the Director with the revised permit application.

(e) The Director may require modification or revocation and reissuance of the Permit to change the name of a Permittee and incorporate such other requirements as may be necessary pursuant to A.A.C. R18-8-270.A (40 CFR 270.40).

(f) When a transfer of ownership or operational control occurs, the Permittee shall comply with the requirements of A.A.C. R18-8-264.A (40 CFR Part 264, Subpart H (Financial Requirements)), unless exempt, until the new owner or operator has demonstrated that they are complying with the requirements of that Subpart. The new owner or operator must demonstrate compliance with Subpart H requirements within six months of the date of the change of ownership or operational control of the facility. Upon demonstration to the Director by the new owner or operator of compliance with Subpart H, the Director shall notify the Permittee that they no longer need to comply with Subpart H as of the date of notification.

[A.A.C. R18-8-270.A, 270.L (40 CFR 270.30(l)(3), 270.40, 270.42); R18-8-264.A (40 CFR 264.12(c))]

4. Monitoring Reports

Monitoring results shall be reported at the intervals specified elsewhere in this Permit.

[A.A.C. R18-8-270.A and 270.L (40 CFR 270.30(l)(4))]

5. Compliance Schedule Reporting

The Permittee must comply with the Compliance Schedule(s) provided at Permit Condition Part II.O. The permittee shall notify the Director in writing, of its compliance or noncompliance with the interim or final requirements no later than 14 days following each interim date and the final date of compliance.

[A.A.C. R18-8-270.A (40 CFR 270.33(a)(3)]

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Permit must be submitted no later than 14 calendar days following each schedule date.

[A.A.C. R18-8-270.A and 270.L (40 CFR 270.30(l)(5))]

6. Manifest Discrepancy Report

If a significant discrepancy in a manifest is discovered, the Permittee must attempt to reconcile the discrepancy. If not resolved within fifteen (15) calendar days, the Permittee must submit a letter report, including a copy of the manifest, to the Director.

[A.A.C. R18-8-270.A and 270.L (40CFR270.30(l)(7)), A.A.C. R18-2-264.A(40 CFR 264.72)]

7. Unmanifested Waste Report

The Permittee must submit an unmanifested waste report to the Director within fifteen (15) calendar days of the receipt of unmanifested waste.

[A.A.C. R18-8-270.A and 270.L (40 CFR 270.30(l)(8)), A.A.C. R18-2-264.A(40 CFR 264.76)]

8. Biennial Report

The Permittee must submit a Biennial Report covering Facility activities during odd numbered calendar years by March 1 of the following even numbered year.

[A.A.C. R18-8-270.A (40 CFR 270.30(l)(9)), A.A.C. R18-2-264.A(40 CFR 264.75)]

9. Other Noncompliance

(a) The Permittee must report all instances of noncompliance not required under A.A.C. R18-8-270.A and 40 CFR 270.30(l)(4), (l)(5) and (l)(6), at the time monitoring (including annual) reports are submitted. Reports shall contain the information listed in A.A.C. R18-8-270.A (40 CFR 270.30(l)(6)).

(b) The Permittee must report all instances of noncompliance not otherwise required to be reported in Permit Conditions I.I.4, I.I.5, and I.I.11, within 60 calendar days, in a "Report of Non-Compliance.". The Reports of Noncompliance must contain the information listed in Permit Condition I.I.11.

[A.A.C. R18-8-270.K and 270.L (40 CFR 270.30(l)(10))]

10. Submissions

(a) Except as provided in Permit Condition I.I.10(c), all reports, correspondence, notices, or other submissions that require a signature and are required in this Permit to be submitted to the Director, must be delivered by U.S. Postal Service or private courier service to:

Arizona Department of Environmental Quality
1110 W. Washington St., 6th Floor
Phoenix, AZ 85007

(b) All deliverables submitted in paper form pursuant to Permit Condition I.I.10(a), must also be submitted in electronic format to the addressee(s) identified in Permit Condition I.I.10(c).

(c) All reports, correspondence, notices, or other submissions required by this Permit to be submitted to the Director must be submitted by electronic mail to: hazwastepermits@azdeq.gov

11. Twenty-Four Hour Reporting

(a) The Permittee must immediately report to the Director any noncompliance which may endanger human health or the environment. Any such information must be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. The report shall include the following:

(i) Information concerning the release of any hazardous waste that may cause an endangerment to public drinking water supplies; and

(ii) Any information of a release or discharge of hazardous waste, or of a fire or explosion from the Facility, which could threaten the environment or human health outside the Facility.

(b) The description of the noncompliance and its cause must include:

(i) Names, addresses, and telephone numbers of the Permittee;

(ii) Name, address, and telephone number of the Facility;

(iii) Date, time, and type of incident;

(iv) Name and quantity of materials involved;

(v) The extent of injuries, if any;

(vi) An assessment of actual or potential hazards to the environment and/or human health outside the facility, where this is applicable; and

(vii) Estimated quantity and disposition of recovered material that resulted from the incident.

(c) A written submission of the occurrence shall also be provided within five (5) calendar days of the time that the Permittee becomes aware of the circumstances. The written submission must contain:

(i) A description of the noncompliance and its cause;

(ii) The period(s) of noncompliance (including exact dates and times);

(iii) Whether the noncompliance has been corrected, and, if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

The Director may waive the five-day written notice requirement in favor of a written report within fifteen (15) days.

[A.A.C. R18-8-270.A (40 CFR 270.30(l)(6))]

12. Other Information

(a) Whenever the Permittee becomes aware that it failed to submit any relevant facts in the Permit application, or submitted incorrect information in a Permit application or in any report to the Director, the Permittee must promptly submit such facts or information no later than 15 calendar days upon discovery of the omission or incorrect information.

[A.A.C. R18-8-270.A and 270.L (40 CFR 270.30(l)(11))]

(b) Noncompliance with terms and conditions of the Permit that result in letters of warning, compliance orders from the Director, a civil consent judgment, or criminal enforcement of environmental laws by the State of Arizona shall be used to document the reliability, expertise, integrity and competence of the Permittee, pursuant to A.A.C. R18-8-270.J, and would be considered by the Director in making future changes to the Permit, pursuant to A.A.C. R18-8-270.A (40 CFR 270 Subpart D); and when issuing a new Permit as set forth in A.A.C. R18-8-270.A (40 CFR 270.51).

[A.A.C. R18-8-270.A (40 CFR Subpart D and 270.51))]

J. SIGNATORY AND CERTIFICATION REQUIREMENTS

All applications, reports, or information submitted to or requested by the Director, his/her designee, or authorized representative, shall be signed and certified in accordance with A.A.C. R18-8-270.A and 40 CFR 270.11 and 270.30(k).

PART II – GENERAL FACILITY CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

General Description of Facility

Munitions Treatment Range (MTR), Barry M. Goldwater Range (BMGR) - Western Segment is located approximately 12 miles southeast of the MCAS Yuma Main Base and two (2) miles south of the Auxiliary Airfield II, at 32°31'21.54"N and -114°31'14.60"W and consists of a reserved area, 1,000 meters on each side, located approximately 3 miles inside the western boundary of the BMGR. It is accessed by an unimproved road approximately one-mile long and surrounded by three- strand barbed wire and razor wire coils. The MTR is used for destruction of unserviceable, outdated, or obsolete munitions through the treatment method of open detonation (OD). The access road divides the MTR into east and west portions and no MTR treatment activities have been conducted in the western portion of the MTR since 1998 due to the area reportedly lying in a floodplain. However, based on a Federal Emergency Management Agency (FEMA) 2024 flood insurance rate map, the entirety of the MTR lies within the 0.2 percent flood rating and no elevated flood risk is present on the MTR. Neither chemical agents nor chemical or nuclear munitions are used or treated on the BMGR. This permit renewal will allow the facility to continue its treatment of waste munitions through open detonation due to the expiration of its current 10-year permit.

Marine Corps Air Station (MCAS) Yuma is located in the City of Yuma, Arizona. The BMGR consists of a wedge-shaped area in the southwestern corner of Arizona, lying within southern Yuma County and extending eastward into Maricopa County and Pima County. It is a 2.8-million-acre area, divided into two segments; the eastern two-thirds is designated the Gila Bend segment (approximately 1.6 million acres) and the western third is designated the Yuma segment. The Yuma segment occupies approximately 760,000 acres and is operated by Marine Corps Air Station (MCAS) Yuma. MCAS Yuma has been responsible for training pilots in aerial and air-to-ground combat since 1941. The Gila Bend Segment belongs to, and is controlled by, the United States Air Force (USAF) and control of BMGR-East is administered through Luke Air Force Base (LAFB).

The Area Location Map, Range Layout Map, MTR Site Location Map, Topographic Site Map, MTR National Flood Insurance Rate Map, and Legal Description are found in Permit Attachment A (Facility Description), Figures A-1 through A-6, respectively.

MTR Operations

MCAS Yuma's Explosive Ordnance Detonation (EOD) unit is solely responsible for conducting operations at the MTR. EOD personnel are trained emergency response specialists. An explosives or munitions emergency response specialist is defined by 40 Code of Federal Regulations (CFR) 260.10 as an individual trained in chemical or conventional munitions explosives handling, transportation, render-safe procedures, or destruction techniques. Explosives or munitions emergency response specialists include technical escort unit, and DoD-certified civilian or contractor personnel; and other federal, state, or local government, or civilian personnel similarly trained in explosives or

munitions emergency responses. All MCAS Yuma EOD personnel have permit- specific training and an appointment letter from MCAS Yuma.

The processes used by MCAS Yuma EOD personnel at the MTR include open detonation of explosive ordnance. This activity may involve subsequent recycling of scrap metal and munitions debris documented as safe. Recycling of scrap metal and munitions debris documented as safe is performed by Range Management.

In the past, scrap metal collected during range clearing operations was buried on the range, and these disposal locations are considered to be solid waste management units (SWMUs) by ADEQ. Currently, inert scrap metal documented as safe is removed from the BMGR during clearing operations and recycled.

Demilitarization of unserviceable, outdated, or obsolete munitions is an adjunct to proper munitions stockpile management. In addition to treating ordnance stockpiled at MCAS Yuma, the MTR is used to treat ordnance and explosive end items from other military bases and bombing ranges, from local government-owned manufacturing facilities, and from local manufacturers under contract to the United States government located in Arizona and California. No explosives are received from private industry for disposal.

At ADEQ's request, the MTR was evaluated for any potential ambient air quality impacts of certain compounds identified with the potential for direct or indirect health effects. The report was issued in 2003 indicating that the air quality impacts from operations at the MTR are below the Arizona Ambient Air Quality Guidelines (AAAQG) levels (or National Ambient Air Quality Standards (NAAQS) levels for ozone and lead)) for each of the munition treatment scenarios. In addition, the 2024 Annual Groundwater and Soil Monitoring Report concluded that no site contaminants of concern were identified in either soil or groundwater samples at concentrations exceeding their applicable project action limits.

Permitted Hazardous Waste Treatment Areas

The hazardous waste treatment units at the facility, subject to the conditions of this Permit include the two main OD areas: (1) the Class A and B detonation area (fragment, non-fragment) and (2) the White Phosphorous detonation area. Explosive ordnance devices are fitted with a time-delayed donor explosive charge and detonated on the ground or in small pits created as a result of previous detonations. Shot-holes are created by the detonation and subsequent detonations increases the pit radius and depth. The detonation pits are inspected weekly, after each detonation, and after storm events or high winds. The pits are inspected for integrity, depth and metal fragments (kickouts). If an inspection indicates a detonation pit is unusable, it is abandoned, not repaired. When a pit becomes too deep (i.e., unsafe to roll a bomb into, 10 feet or deeper) MCAS Yuma EOD will mark the pit with surveyors' tape and the Environmental Department will be notified in writing. The Environmental Department will sample the pit and will request an escort from EOD for backfilling the pit with native soil. After backfilling, a new detonation pit is developed in the same place as a result of the next OD event.

All explosives greater than caliber .50 are detonated. OD operations at the MTR are not conducted on a set schedule; rather, treatment operations are conducted on an as-needed

basis. Operations are not conducted in wet weather, when winds exceed 15 mph, in thunderstorms or electric storms. The maximum amount of waste military munitions authorized per detonation is 1,000 pounds Net explosive Weight (NEW).

Munitions to be treated, including those received from offsite sources may be held at the MCAS Yuma Ammunition Supply Point (ASP) in the designated EOD magazine for a period not to exceed ten days. The facility consists of bunkers on the south end of Main Base. At the ASP, waste items are inspected, verified against shipping papers (or if from an in-house source, logged on an inventory form as to the type, the NEW, quantities of each item and net cubic feet of displacement), and consolidated, as needed. The waste inventory is manifested to the MTR. Prior to mobilization to the MTR, MCAS Yuma EOD prepares a detailed Hazardous Waste Treatment Operations Order identifying staff and responsibilities for the mission. Each team member reads and signs the document prior to executing the mission.

Munitions are loaded onto vehicles for transport to the MTR. Seven-ton tactical trucks may also be used for transport. All transport operations are performed on the day the treatment is to occur. The number of vehicles used depends on the type and amount of items being transported. Upon arrival at the MTR, red flags are displayed on the north and south flagpoles (one mile from the MTR) to indicate that the range is active and treatment operations are in progress. The waste items are transported to and unloaded at the designated area for detonation.

All treated munitions are examined for treatment effectiveness. Second or subsequent detonations are performed until the operation is successful. Metal casings and kickouts are inspected and collected for recycling as scrap metal. Incomplete or low-order detonations shall be documented in the Annual Waste Management Performance Report (Permit Condition II.O.3) and Quarterly Progress Reports (Permit Condition II.O.4).

All operations are monitored from both north and south range flag areas located approximately one mile from the MTR. Two safety bunkers intended for emergency use only are located in the detonation area and are constructed of reinforced concrete. The concrete shelters are located on the MTR with the shelter entrances opposite of the staged detonations.

There will be no storage nor treatment of hazardous waste in tanks, nor shall any land disposal units such as hazardous waste landfills, waste piles, surface impoundments, or land treatment units be constructed at the facility.

Solid Waste Management Units (SWMUs)

RCRA Section 3004(u), as amended by the Hazardous and Solid Waste Amendments (HSWA), and A.A.C. R18-8-264.A (40 CFR 264.101 and 40 CFR 264, Subpart S) requires that Permits issued after November 8, 1984, address corrective action for releases of hazardous waste and hazardous waste constituents from any Solid Waste Management Unit (SWMU) at the facility, regardless of when the waste was placed in the unit.

Past releases have been comprehensively investigated by the Permittee, and these releases have been determined to not pose a threat to human health or the environment. A

determination of No Further Action has been made by ADEQ for such past releases of hazardous waste and hazardous waste constituents.

Should the Permittee discover a new SWMU or an area of concern (AOC) at the facility, or determine that a release has occurred, the facility will be governed by the conditions of Permit Part IV (hereinafter referred to as the "Corrective Action Schedule of Compliance" or "CASOC").

B. REQUIRED NOTICES

1. Hazardous Waste Imports

   If the Permittee will arrange to receive hazardous waste subject to R18-8-262.A (40 CFR part 262, subpart H), from a foreign source, the Permittee must submit notice of such import in accordance with required notices requirements in R18-8-264.A (40 CFR 264.12(a)) and must comply with the imports of hazardous waste requirements in R18-8-262.A (40 CFR 262.84), and the use of manifest system requirements in R18-8-264.A (40 CFR 264.71(a)(3) and 264.71(d)).

   [A.A.C. R18-8-262.A and 264.A (40 CFR 262.84, 264.12(a), 264.71(a)(3) and 264.71(d))].

2. Hazardous Waste from Off-Site Sources

   When the Permittee is to receive hazardous waste from an offsite source (except where the Permittee is also the generator), the Permittee must inform the generator in writing that the Permittee has the appropriate hazardous waste permit(s) for, and will accept, the waste the generator is shipping. The Permittee must keep a copy of this written notice as part of the Facility's Operating Record in accordance with 40 CFR 264.73.

   [A.A.C. R18-8-264.A (40 CFR 264.12(b))]

C. GENERAL WASTE ANALYSIS

Due to the unique nature of the Facility's OD treatment operations, the waste end-of-life products (i.e., unserviceable, outdated, or obsolete munitions) are subject to generator knowledge based on product profiles where the chemical composition description or chemical composition is provided. The Permittee shall conduct any additional sampling and analysis that the Director determines necessary to ensure that there are no significant impacts on human health or the environment as described in the Waste Analysis Plan (Permit Attachment B).

The Permittee shall follow the waste analysis procedures, as described in the Waste Analysis Plan (Permit Attachment B).

1. Annual Waste Stream Evaluation

   The Permittee shall perform waste stream evaluation in accordance with the Waste Analysis Plan (Permit Attachment B). Laboratory testing shall be conducted in accordance with the methods described in the Waste Analysis Plan (Permit Attachment B), Test Methods for Evaluating Solid Waste: Physical/Chemical

Methods, EPA Publication SW-846 (current edition), or equivalent or better methods approved by the Director.

At a minimum, the Permittee shall maintain proper functioning instruments, use approved sampling and analytical methods, verify the validity of sampling and analytical procedures, and perform correct calculations. If the Permittee uses a contract laboratory to perform analyses, then the Permittee shall inform the laboratory in writing that it must operate under the waste analysis conditions set forth in this Permit.

[A.A.C. R18-8-264.A (40 CFR 264.13)]

2. ADHS Certification

All analytical testing performed directly for the Permittee at off-site laboratories or on-site laboratories, in-state or out-of-state, must be conducted by laboratories licensed (certified) by the Arizona Department of Health Services for the applicable analytical methods in use at the off-site or on-site laboratory.

[A.R.S. Title 36, Chapter 4.3, Article I, Section 36-495.01]

D. SECURITY

The Permittee shall comply with the security provisions of A.A.C. R18-8-264.A, 40 CFR 264.14(a), (b) and (c) and those contained in Permit Attachment E (Procedures to Prevent Hazards).

E. GENERAL INSPECTION REQUIREMENTS

The Permittee shall comply with the general inspection requirements of A.A.C. R18-8-264.A, 40 CFR 264.15 and those contained in Permit Attachment E (Procedures to Prevent Hazards). The Permittee shall follow the inspection schedule set out in the attachment and address any deterioration or malfunction discovered by an inspection, as required by A.A.C. R18-8-264.A and 40 CFR 264.15(c). Inspection records shall be kept, as required by A.A.C. R18-8-264.A and 40 CFR 264.15(d).

1. The Permittee must inspect the Facility for malfunctions and deterioration, operator errors, and discharges which may be causing – or may lead to (1) release of hazardous waste constituents to the environment or (2) a threat to human health. The Permittee must conduct these inspections in accordance with the Inspection Program of Permit Attachment E (Procedures to Prevent Hazards) to identify problems in time to correct them before they harm human health or the environment.

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.15(a), 270.14(b)(5))]

2. The Permittee must follow the written inspection checklist and schedule for inspecting monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that are important to preventing, detecting, or responding to environmental or human health standards in accordance with Permit Attachment E (Procedures to Prevent Hazards), Exhibit E-1. The

Permittee must maintain a copy of this written inspection schedule with the Inspection Plan at the Facility.

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.15(b)(1) and (b)(2), 270.14(b)(5))]

3. The inspection form and instructions must identify the types of problems (e.g., malfunctions or deterioration) which are to be looked for during the inspection in accordance with the written inspection checklist in Permit Attachment E (Procedures to Prevent Hazards). The inspection checklist must state the frequency of inspection for each item. The frequency of inspection of the items identified in Permit Attachment E (Procedures to Prevent Hazards) and Exhibit E-1 must be based on the rate of deterioration of the equipment and the probability of an environmental or human health incident if the deterioration, malfunction, or operator error goes undetected between inspections.

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.15(b)(3) and (b)(4), 270.14(b)(5))]

4. The inspection checklist must include at a minimum, the items and inspection frequencies identified in A.A.C. R18-8-264.A and 40 CFR 264.174.

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.15(b)(4), 270.14(b)(5))]

5. The Permittee must remedy any deterioration or malfunction of equipment or structures identified during the inspection, on a schedule which ensures that the problem does not lead to an environmental or human health hazard in accordance with Permit Attachment E (Procedures to Prevent Hazards). Where a hazard is imminent or has already occurred, the Permittee must take remedial action immediately in accordance with the Contingency Plan (Permit Attachment F).

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.15(c), 270.14(b)(5) and (b)(7))]

6. The Permittee must record inspections in an inspection log or form in the Facility's operating record available upon request. The Permittee must retain these records of inspection for at least three (3) years from the date of inspection. At a minimum, the inspection record must include the date and time of the inspection, name of the inspector, notations of the observations or monitor measurement for each item inspected, and the date and nature of any repairs or other remedial action to address the inspection observation.

[A.A.C. R18-8-264.A, (40 CFR 264.15(d))]

F. PERSONNEL TRAINING

The Permittee shall conduct personnel training, as required by A.A.C. R18-8-264.A and 40 CFR 264.16. This training program shall follow the outline contained in Permit Attachment G (Personnel Training). The Permittee shall maintain training documents and records, as required by A.A.C. R18-8-264.A and 40 CFR 264.16(d) and (e).

1. Facility personnel, including any operators and contractors, must successfully complete a training program for their position and responsibilities at the Facility, in accordance with Permit Attachment G (Personnel Training).

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.16(a)(1), 270.14(b)(12))]

2. The program must be directed by a person who is trained in hazardous waste management procedures, and must include instruction for Facility personnel in the hazardous waste management procedures relevant to their positions in which they are employed in accordance with Permit Attachment G (Personnel Training).

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.16(a)(2), 270.14(b)(12))]

3. The training program must be designed to ensure that Facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems in accordance with Permit Attachment G (Personnel Training).

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.16(a)(3), 270.14(b)(12))]

4. Facility personnel must successfully complete the Facility's training program for their position in accordance with Permit Conditions II.F.1. through II.F.3. and Permit Attachment G (Personnel Training), within six months after the date of their employment or assignment to the Facility, or to a new position at the Facility, whichever is later.

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.16(b), 270.14(b)(12))]

5. Facility personnel must take part in an annual review of the material included in their initial training, see Permit Conditions II.F.1. through II.F.4. The Permittee must document that each Facility employee has completed this annual review of the initial training compliant with this Permit and Permit Attachment G (Personnel Training), in the Facility's operating record. If the review identifies any changes in the training program necessary to remain in compliance with this Permit, the Permittee must request a permit modification indicating the necessary revisions to the training program in Permit Attachment G (Personnel Training), by the end of each calendar year.

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.16(c), 270.14(b)(12))]

6. The Permittee must record both introductory and continuing training that is given to each person related to hazardous waste management, in the employee's personnel record. Training records must include a description of the type and amount of the training, including training content, date of training, total training hours for the training date, certification date as applicable, and other relevant training information like the name of the instructor or training provider and their qualification to instruct the training event.

[A.A.C. R18-8-264.A, (40 CFR 264.16(d))]

7. The Permittee must maintain and keep training documents on current personnel at the Facility until closure of the facility in accordance with 40 CFR 264.16(d) and (e), and Permit Attachment G (Personnel Training). Training records on former employees must be kept for at least three years from the date the employee last worked at the facility. Personnel training records may accompany personnel transferred within the same company. and records.

[A.A.C. R18-8-264.A and 270.A, (40 CFR 264.15(d) and (e), 270.14(b)(12))]

G. SPECIAL PROVISIONS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

The Permittee shall comply with the requirements of A.A.C. R18-8-264.A and 40 CFR 264.17. The Permittee shall follow the procedures for the prevention and handling of ignitable, reactive, and incompatible wastes as set forth in the Waste Analysis Plan (Permit Attachment B) and Permit Attachment E (Procedures to Prevent Hazards).

[A.A.C. R18-8-264.A, (40 CFR 264.17)]

1. The Permittee must take precautions, as documented in Permit Attachment E (Procedures to Prevent Hazards), to prevent accidental ignition or reaction of ignitable or reactive waste. The Permittee must separate and protect ignitable and reactive waste from sources of ignition or reaction including but not limited to open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable or reactive waste is being handled, the Permittee must confine smoking and open flame to specially designated locations. The Permittee must conspicuously place "No Smoking" signs wherever there is a hazard from ignitable or reactive waste.

   [A.A.C. R18-8-264.A and 270.A, (40 CFR 264.17(a), 270.14(a)(9))]

2. The Permittee must take precautions to prevent reactions which generate extreme heat or pressure, fire or explosions, or violent reactions; produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment; produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; damage the structural integrity of the device or Facility; and through other like means threaten human health or the environment.

   [A.A.C. R18-8-264.A, (40 CFR 264.17(b))]

3. The Permittee must demonstrate compliance with Permit Conditions II.G.1 - G.3. in the Facility's operating records. This documentation may be based on references to published scientific or engineering literature, data from trial tests (e.g., bench scale or pilot scale tests), waste analyses (as specified in A.A.C. R18-8-264.A (40 CFR 264.13)), or the results of the treatment of similar wastes by similar treatment processes and under similar operating conditions.

   [A.A.C. R18-8-264.A and 270.A, (40 CFR 264.17(c), 270.14(a)(9))]

H. PREPAREDNESS AND PREVENTION

The Permittee shall comply with the requirements of A.A.C. R18-8-264.A and 40 CFR Subpart C, Preparedness and Prevention, in which the Facility is designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.

1. Required Equipment

At a minimum, the Permittee shall maintain at the facility the equipment set forth in the Permit Attachment E (Procedures to Prevent Hazards), the Contingency Plan (Permit Attachment F), and as required by A.A.C. R18-8-264.A and 40 CFR 264.32.

[A.A.C. R18-8-264.A (40 CFR 264.32)]

2. Testing and Maintenance of Equipment

The Permittee shall test and maintain the equipment specified in Permit Condition II.H.1., as necessary, to assure its proper operation in time of emergency, as required by A.A.C. R18-8-264.A and 40 CFR 264.33.

[A.A.C. R18-8-264.A (40 CFR 264.33)]

3. Access to Communications or Alarm System

The Permittee shall maintain access to the communications or alarm system, as required by A.A.C. R18-8-264.A and 40 CFR 264.34.

[A.A.C. R18-8-264.A (40 CFR 264.34)]

4. Arrangements with Local Authorities

The Permittee shall maintain arrangements with state and local authorities, as required by A.A.C. R18-8-264.A and 40 CFR 264.37. If state or local authorities refuse to enter into such arrangements with the Permittee, the Permittee must document this refusal in the operating record. All correspondence related to these arrangements must be kept with the Contingency Plan (Permit Attachment F).

[A.A.C. R18-8-264.A (40 CFR 264.52(c))]

I. CONTINGENCY PLAN

1. Implementation of Plan

(a) The Permittee shall immediately carry out the provisions of the Contingency Plan (Permit Attachment F), and ensure compliance with the emergency procedures described by A.A.C. R18-8-264.A, C and F, and 40 CFR 264.56 whenever there is a fire, explosion, or release of hazardous waste or constituents which could threaten human health or the environment.

[A.A.C. R18-8-264.A, C, and F (40 CFR 264.51(b) and 264.56))]

(b) As part of the remedial action taken in response to a fire, release, or unplanned explosion of hazardous waste where hazardous waste is released from the facility beyond the facility boundary and has impacted surface soil, the Permittee shall sample and analyze to determine the extent and depth of any soil contamination present at concentrations which could threaten human health or the environment. Alternatively, the Permittee may conduct soil sampling after removal of soil contaminated with hazardous waste or hazardous constituents to verify that concentration of hazardous waste or constituents do not threaten human health and the environment. Sample types, locations, analytes and methods may be subject to the approval of the Director.

The sampling and analytical methods used must be consistent with those published in Test Methods for Evaluating Solid Waste: Physical/ Chemical Methods, EPA Publication SW-846 (current edition). Each parameter test that the in-state or out-of-state laboratory can perform for hazardous waste analysis must be licensed by ADHS.

A report of the sampling and analysis must be kept on file. The report shall include:

(i) The number of samples collected;

(ii) The location and size of each sample;

(iii) The depth of each sample;

(iv) The specific analytical methods used;

(v) A description of the sampling tools, containers, filling, sealing, and preservation methods.

In addition, each parameter test that the in-state or out-of-state laboratory can perform for hazardous waste analysis must be licensed (certified) by Arizona Department of Health Services as stated in Permit Attachment B (Waste Analysis Plan) and Permit Attachment H (Closure Plan). [A.R.S. Title 36, Chapter 4.3, Article 1, Section 36-495.01]

If the samples indicate that there is soil contamination, then the report must also include the following information:

(i) Description of the statistical methods used;

(ii) Soil type and permeability information

(iii) Groundwater depth and quality information; and

(iv) Procedures establishing background contaminant concentrations.

(c) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he/she must immediately notify the Director, and either the government official designated as the on-scene coordinator for that geographical area, or the National Response Center in accordance with A.A.C. R18-8-264.A and F (40 CFR 254.56(d)).

[A.A.C. R18-8-264.A (40 CFR 264.56(d))]

2. Copies of Plan

The Permittee shall maintain a copy of the Contingency Plan (Permit Attachment F) at the facility and shall provide a copy to all police departments, fire departments, hospitals, and State and local emergency response teams that may be asked to provide emergency assistance, as required by A.A.C. R18-8-264.A and 40 CFR

264.53. Documentation of timely submittal of contingency plans and revisions shall be in the form of a certified mail receipt, or similar documentation, and retained in the facility operating record.

[A.A.C. R18-8-264.A (40 CFR 264.53)]

3. Amendments to Plan

The Permittee shall review and, if necessary, request a permit modification to the Contingency Plan (Permit Attachment F), as required by A.A.C. R18-8-264.A and 40 CFR 264.54.

[A.A.C. R18-8-264.A (40 CFR 264.54)]

4. Emergency Coordinator

(a) The emergency coordinator (EC) must be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, the location and characteristics of wastes handled, the location of all records within the facility, the facility layout, and the authority to commit the resources needed to carry out the Contingency Plan (Permit Attachment F), as required by A.A.C. R18-8-264.A and 40 CFR 264.55.

(b) During operating hours of the facility, the EC shall be on the facility premises or on call (must be able to immediately reach the facility) in case of an emergency, as required by A.A.C. R18-8-264.A and 40 CFR 264.55.

(c) A list of persons authorized to act as an EC shall be found after the title page of the Contingency Plan (Permit Attachment F). Any change to the names, addresses, and phone numbers of all persons qualified to act as an EC, as listed in the Contingency Plan, shall be supplied to the Director as a permit modification pursuant to Permit Condition II.I.3 above.

[A.A.C. R18-8-264.A (40 CFR 264.52(d) and 40 CFR 264.55)].

J. RECORDKEEPING AND REPORTING

In addition to the record keeping and reporting requirements specified elsewhere in this Permit, A.A.C. R18-8-264.A, and 40 CFR 264.77, the Permittee shall comply with the following:

1. Operating Record

The Permittee shall maintain a written (or electronic as noted below) operating record at the facility for three years unless otherwise noted, in accordance with A.A.C. R18-8-264.A and 40 CFR 264.73, to include but not be limited to:

(a) A description and the quantity of each hazardous waste received and the method(s) and date(s) of its treatment, storage, and/or disposal at the facility (this may be a written record or an electronic record with written report provided upon request by the Director's authorized representative). This information must be maintained in the operating record until closure of the facility;

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(1) including Appendix I)]

(b) The location of each hazardous waste within the facility, the quantity at each location, and cross references to specific manifest document numbers, if the waste was accompanied by a manifest (this may be a written record or an electronic record with written report provided upon request by the Director's authorized representative). This information must be maintained in the operating record until closure of the facility;

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(2))]

(c) The records and results of waste analyses and waste determinations (this may be a written record or an electronic record with written report provided upon request by the Director's authorized representative);

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(3))]

(d) The summary reports and details of all incidents that require implementing the Contingency Plan (this may be a written record or an electronic record with written report provided upon request by the Director's authorized representative);

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(4))]

(e) The records and results of inspections (this may be a written or an electronic record, however electronic records of any checklist must be identical electronic images of the original written record);

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(5))]

(f) The monitoring, testing or analytical data, and corrective action; this includes documentation demonstrating monitoring, maintenance and testing of components and equipment at the facility related to management of hazardous waste is completed at the required frequencies. Maintain in the operating record for three years, except for records and results pertaining to groundwater monitoring and cleanup, which must be maintained in the operating record until closure of the facility (this may be a written record or an electronic record with written report provided upon request by the Director's authorized representative);

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(6))]

(g) Copies of waste minimization documents required in Permit Condition II.N (this may be a written record or an electronic record with a written report provided upon request by the Director's authorized representative. However, waste minimization certifications must be an identical electronic image of the original written record);

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(9))]

(h) The notices, certification and demonstration, if applicable, required of generators (this may be a written record or an electronic record, however they must be an identical electronic image of the original written record).

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(7))]

2. Manifests

The Permittee shall comply with the manifest requirements of A.A.C. R18-8-264 and 40 CFR 264 Subpart E.

[R18-8-264.A (40 CFR 264 Subpart E)]

K. GENERAL CLOSURE REQUIREMENTS

1. Update of Final Closure Plan Prior to Implementation of Final Closure

No later than six months prior to final closure of the MTR, the Permittee shall submit a revised closure plan for ADEQ approval in accordance with the permit modification procedures of R18-8-270.A (40 CFR 270.41, 40 CFR §270.42 et seq.). The Permittee shall not commence with any of the steps (e.g., notification of closure) of final closure of the facility without having the final closure plan approved by the Director.

2. Performance Standard

The Permittee shall close the facility, as required by A.A.C. R18-264.A, 40 CFR 264.111, and in accordance with the Closure Plan (Permit Attachment H). Performance standards for soils are non-Residential Soil Remediation Levels (SRLs), given in A.A.C. R18-7, Appendix A. The Permittee shall submit any changes to performance standards as a permit modification request in accordance with Permit Condition I.C.2.

3. Amendment to Closure Plan

The Permittee shall amend the Closure Plan (Permit Attachment H), in accordance with A.A.C. R18-8-264.A and 40 CFR 264.112(c), whenever necessary, and as required by Permit Condition II.K.1.

4. Notification of Closure

The Permittee shall notify the Director in writing at least forty-five (45) days prior to the date on which he/she expects to begin partial closure of any permitted unit or units, or final closure of the facility. Partial Closure activities will follow the same steps as identified under Permit Condition II.K.1, except that partial closure plans and notifications shall be specific to the unit or units to be closed at that time.

[A.A.C. R18-8-264.A (40 CFR 264.112(d)]

5. Time Allowed for Closure

Within ninety (90) days after receiving the final volume of hazardous waste, the Permittee shall remove from the facility all hazardous waste and shall complete closure activities, in accordance with A.A.C. R18-8-264.A, 40 CFR 264.113 and the schedules specified in the Closure Plan (Permit Attachment H).

6. Disposal or Decontamination of Equipment, Structures, and Soils

The Permittee shall decontaminate and/or dispose of all contaminated equipment, structures, and soils, as required by A.A.C. R18-8-264.A, 40 CFR 264.114 and the Closure Plan (Permit Attachment H).

Each parameter test that the in-state or out-of-state laboratory performs for Hazardous Waste analysis during closure must be licensed (certified) by Arizona Department of Health Services.

[A.R.S. Title 36, Chapter 4.3, Article 1, Section 36-495.01]

7. Closure Report

Within sixty (60) days of completion of closure of the unit(s), the Permittee shall submit a closure report that includes at least the following information:

(a) A summary of results, significant observations, deviations from the approved plan, and conclusions.

(b) A detailed discussion of the closure procedures followed for each unit. Include a description of:

(i) The procedures followed for decontamination of the hazardous waste management unit (including disposition of residues);

(ii) The equipment used for decontamination of the hazardous waste management unit;

(iii) The sampling procedures used;

(iv) The equipment used for sampling;

(v) The remedial procedures (if applicable) used;

(vi) The equipment used for remediation (if applicable);

(vii) The analytical procedures and methods used;

(viii) The analytical equipment used;

(ix) The quality assurance program used;

(x) The procedures used to prevent hazards and protect field personnel during closure;

(xi) The equipment used to prevent hazards and protect field personnel during closure;

Also include drawings and photographs where appropriate and identify any deviations from the approved plan.

(c) Data generated from sampling and analysis activities performed pursuant to the plan, including field notes, manifests, bills of lading, Land Disposal Restriction (LDR) forms, laboratory submittal forms, chain-of-custody forms, laboratory reports, and drilling logs.

(d) Risk assessment discussion (if applicable), including methodology, data, references, and assumptions.

(e) Certifications from the engineer and owner/operator.

(f) Other information requested by the Director.

8. Certification of Closure

The Permittee shall certify that the facility has been closed in accordance with the specifications in the Closure Plan (Permit Attachment H).

[A.A.C. R18-8-264.A and 40 CFR 264.115]

L. LAND DISPOSAL RESTRICTIONS

Munitions that are treated by open detonation under this permit are not subject to the LDR requirements since open detonation is a treatment process. (see 50 Fed Reg 46952). In all other respects dealing with hazardous waste disposal activities, the Permittee shall comply with all the applicable Land Disposal Restriction (LDR) requirements of 40 CFR Part 268, not limited to: the required notices, use of the hazardous waste debris rule, and storage prohibitions of A.A.C. R18-8-268.A, and 40 CFR 268.7, 268.45, and 268.50, as applicable.

M. TOXICITY CHARACTERISTICS

The Permittee shall use the Toxicity Characteristic Leaching Procedure (TCLP) (Appendix II of 40 CFR Part 261), or use knowledge of the waste (A.A.C. R18-8-264.A and 40 CFR §264.13(a), and A.A.C. R18-8-262.A and 40 CFR §262.11) to determine whether a waste exhibits the characteristic of toxicity, as defined in 40 CFR §261.24.

N. WASTE MINIMIZATION CERTIFICATION

1. Annual Certification

The Permittee shall annually certify:

(a) That the Permittee has a program in place to reduce the volume and toxicity of all hazardous wastes which are generated by the facility operations to the degree, determined by the Permittee, to be economically practicable; and,

(b) That the method of treatment, storage, or disposal is the only practicable method or combination of methods currently available to the facility which minimizes the present and future threat to human health and the environment.

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(9))]

2. Signatory Requirements

This certification shall be retained with the facility's operating record and shall comply with the signatory requirement of Permit Condition I.J (Signatory and Certification Requirements).

O. SCHEDULE OF COMPLIANCE

1. Groundwater and Soil Monitoring Activities

(a) The Permittee shall conduct groundwater monitoring at the facility annually in accordance with the approved Groundwater Monitoring Plan (Attachment D, Exhibit D-1).

(b) The Permittee shall conduct soil monitoring at the facility's active detonation pits prior to each backfill and at a frequency of no less than annually according to the MTR Standard Operating Procedures "Explosive Ordnance Disposal," and in accordance with the approved Soil Monitoring Plan (Attachment D, Exhibit D-2).

(c) An "Annual Groundwater and Soil Monitoring Report" shall be submitted by March 1st of each year addressing the results from the groundwater and soil monitoring sampling activities conducted during the previous year as required in Permit Conditions II.O.1(a) and (b).

2. Waste Analysis Verification and Waste Minimization Certification

(a) The Permittee shall verify, prior to treatment, that the quantity and type of munitions received is consistent with that shown on the generator's manifest.

(b) An "Annual Verification of Waste Analysis and Waste Minimization Certification Report" shall be submitted by March 1st of each year addressing the waste analysis verification results and the waste minimization certification from the previous year as required in Permit Condition II.O.2(a) and Permit Condition II.N.1, respectively.

3. Waste Management Performance Report

(a) The Permittee shall prepare a waste management performance report documenting waste management approaches implemented annually at the facility.

(b) An "Annual Waste Management Performance Report" shall be submitted by March 1st of each year for all related activities from the previous fiscal year as required in Permit Condition II.O.3(a), including the annual survey, collection, and disposition activities of scrap metal at the MTR.

4. Quarterly Progress Reports

(a) The Permittee shall prepare quarterly progress reports addressing the following activities conducted at the MTR:

(i) MTR hazardous waste treatment operations;

(ii) Survey, collection, and disposition of scrap metal, as appropriate.

(iii) Inspections conducted at the MTR under this permit;

(iv) Groundwater/soil monitoring and sampling activities;

(v) Training, including, but not limited to:

a. RCRA

b. Waste determinations

c. Permitting

d. Sampling

e. Recordkeeping

(vi) Other activities pursuant to this permit;

(vii) Issues and corrective actions; and

(viii) Projected work activities.

(b) Quarterly progress reports shall be submitted within two weeks after the end of each quarter of the year.

5. Alternative Technology Assessment

(a) Within one year of the effective date of this permit, the Permittee shall submit an Alternative Technologies Assessment (ATA) report that evaluates whether safe alternative technologies are available to treat hazardous waste explosives at the MTR by open detonation, in compliance with R18-8-265.A (40 CFR 265.382) which states that "[w]aste explosives include waste which has the potential to detonate and bulk military propellants which cannot be safely disposed of through other modes of treatment." The ATA is intended to investigate whether "other modes of treatment" are available in compliance with R18-8-265.A (40 CFR 265.382). The draft ATA report shall be submitted to ADEQ as a Class 1* Permit Modification Request (PMR) (requiring Director approval), with the final ADEQ-approved report to be submitted after a review and comment period(s). In evaluating the availability of safe alternative technologies, the report shall consider the following guidance and EPA memorandums:

(i) Memorandum Open Burning and Open Detonation (OB/OD) of Waste Explosives Under the Resource Conservation and Recovery Act (RCRA), Carolyn Hoskinson, Director of the Office of Resource Conservation and Recovery, June 7, 2022.

(ii) Alternative Treatment Technologies to Open Burning and Open Detonation of Energetic Hazardous Wastes, Final Report, Office of Resource Conservation and Recovery, Publication Number EPA 530-R-19-007, December 2019.

(iii) Alternatives for the Demilitarization of Conventional Munitions, The National Academies Press, ISBN 978-0-309-47732, 2019.

(iv) Revisions to Standards for the Open Burning/Open Detonation of Waste Explosives, Proposed Rule, 89 FR 19952, March 20, 2024.

(v) Department of Defense Open Burn and Open Detonation Alternative Technology Evaluation Prioritization for 40 Code of Federal Regulations Part 264, Subpart X and Interim Status Applicable Units, Memorandum for Assistant Secretary of the Army (Installations, Energy and Environment), January 31, 2025.

[[R18-8-265.A (40 CFR 265.382)]

(b) The Facility shall conduct a re-evaluation of the ATA at least once every five years.

(c) Copies of the above guidance and EPA memorandums are available to the Permittee by contacting the ADEQ Contact prior to preparing the ATA report.

(d) The ATA report shall be prepared by a person who is qualified to evaluate the availability and applicability of safe alternative technologies for open detonation, considering the types of wastes that may be treated at the MTR.

(e) The final report shall be certified and sealed by an Arizona registered professional engineer, and shall be certified by the signatory for USAGY or by the signatory's duly authorized alternate representative, in accordance with R18-8-270.A (40 CFR 270.11(b)).

(f) Based on the results of the final ATA report, the permittee shall provide a recommendation for operational permit changes to support one or more alternative technologies that are determined by the permittee to be safe and available, as necessary. Such recommendations shall be submitted to ADEQ as Class 1* PMRs (requiring Director approval), and will include documentation support and rationale for the choices presented.

(g) Within 90 days of the Director's approval of an alternative technology or technologies proposed by the permittee, the permittee shall submit a Class 1* PMR to ADEQ (requiring Director approval), to develop an implementation schedule for the identified alternative technology or technologies. The schedule will include all significant milestones including, but not limited to:

(i) Funding procurement.

(ii) Vendor procurement.

(iii) Construction start and completion dates of alternative technology, if applicable.

(iv) Testing plan.

(v) Results of alternative technology testing.

(h) Note: A Department of Defense (DoD) memorandum was published on January 31, 2025 to address its open burn and open detonation (OB/OD) policy regarding the adoption of alternative technologies. DoD agreed to work with its regulatory partners to "evaluate and, if identified, implement

proven alternative technology to OB and OD at DoD facilities where viable." DOD further stated that an alternative technology evaluation must be conducted for small quantity OB and OD permitted facilities (e.g., Range Support missions) in coordination with the permitting authority, including MCAS Yuma.

6. Groundwater Monitoring Technical Memorandum

Within one year of the effective date of this permit, the Permittee shall submit a draft technical memorandum (TM) demonstrating whether the current groundwater monitoring well is (a) sufficient enough to reliably detect potential off-site migration of munitions constituents via groundwater and (b) satisfies the standards for groundwater monitoring established in 40 CFR 264 Subpart F. The draft TM shall be submitted to ADEQ as a Class 1* Permit Modification Request (PMR) (requiring Director approval), with the final ADEQ-approved report to be submitted after a review and comment period(s).

7. Soil Monitoring Plan

Within one year of the effective date of this permit, the Permittee shall submit a revised Soil Monitoring Plan (SMP) that incorporates sampling protocols consistent with standard site characterization practices for OD sites. The draft SMP shall be submitted to ADEQ as a Class 1* Permit Modification Request (PMR) (requiring Director approval), with the final ADEQ-approved report to be submitted after a review and comment period(s).

8. Sampling and Analysis Plan for Closure

Within three months of approval of the revised final SMP of Permit Condition II.O.7, the Permittee shall submit a revised draft Sampling and Analysis Plan (SAP) for Closure (Permit Attachment H, Exhibit H-1) that incorporates the approved sampling protocols consistent with standard site characterization practices for OD sites, as presented in the revised Soil Monitoring Plan of Permit Condition II.O.7. The draft SAP for Closure shall be submitted to ADEQ as a Class 1* Permit Modification Request (PMR) (requiring Director approval), with the final ADEQ-approved report to be submitted after a review and comment period(s).

9. Scrap Metal Surveying and Collection Plan

(a) Within one year of the effective date of this permit, the Permittee shall submit a draft Scrap Metal Surveying and Collection Plan (SMSCP) that incorporates surveying and scrap metal collection protocols consistent with calculated kickout distances for open detonation conditions including munition quantities treated, types of detonation (i.e., low-level, high-level) used for treatment, characterization of scrap metal for recycling or additional treatment, and other considerations affecting kickout distances.

(b) The Scrap Metal Surveying and Collection Plan shall include a Standard Operating Procedure (SOP), as an Appendix, that describes appropriate kickout distances for various conditions involving the open detonation of munitions. The SOP must consider site-specific detonation deposition

modeling, actual worst-case maximum fragment distances derived from waste-specific data or specifications, etc.).

(c) The draft SMSCP (and SOP) shall be submitted to ADEQ as a Class 1* Permit Modification Request (PMR) (requiring Director approval), with the final ADEQ-approved report to be submitted after a review and comment period(s).

10. SWMU/AOC Summary Report

Within one year of the effective date of this permit, the Permittee shall submit a draft of a new Attachment L (entitled "SWMU/AOC Summary Report") that compiles and/or summarizes the information and status of all SWMUs and AOCs at the facility in accordance with A.A.C. R-18-8-270(A) and 40 CFR 270.14(d). The draft Attachment L shall be submitted to ADEQ as a Class 1* Permit Modification Request (PMR) (requiring Director approval), with the final ADEQ-approved report to be submitted after a review and comment period(s).

11. Waste Analysis Plan

Within one year of the effective date of this permit, the Permittee shall revise and submit the Waste Analysis Plan (Permit Attachment B) to clarify exactly how MCAS Yuma Station Weapons acquires the chemical composition for explosive items (i.e., specify what databases, documents, etc. are utilized to ensure the accuracy of the generator knowledge being assigned to waste sent to the MTR for treatment), and to clarify which SOPs are used to ensure the accuracy of the generator knowledge they are relying on with respect to all components in each munition they receive for treatment (e.g., wiring, casings, coatings, etc., in addition to the propellant and explosive fillers). The draft Attachment B shall be submitted to ADEQ as a Class 1* Permit Modification Request (PMR) (requiring Director approval), with the final ADEQ-approved report to be submitted after a review and comment period(s).

PART III – TREATMENT OF ENERGETIC WASTES

A. MANAGEMENT OF MISCELLANEOUS UNITS - SUMMARY

The MTR is a miscellaneous unit subject to A.A.C. R18-8-264.A and 40 CFR §264 regulations [40 CFR §264.600 - Subpart X]. OD operations are conducted throughout the MTR. There are two OD areas within the MTR: the fragmentation area and the white phosphorus detonation area. The fragmentation area is used for detonating Class 1.1, 1.2, and 1.3 explosives. The fragmentation area may also be used for detonating some Class 1.4 items, some of which may carry the D008 (lead), D009 (mercury) and/or D030 (2,4-dinitrotoluene [DNT]) waste codes. Specific prohibitions are listed in Part III.B.2.

Each OD area includes several shotholes or pits. The shotholes are created by the detonation of unexploded ordnance. The detonation of a bomb creates a pit and subsequent detonation of bombs increases the pit radius and depth. The detonation pits are inspected weekly, after each detonation, and after storm events or high winds. The pits are inspected for integrity, depth, and metal fragments (kickouts). If an inspection indicates a detonation pit is unusable, for example, when the pit becomes too deep (i.e., it is unsafe to roll a bomb into, 10 feet or deeper), the pit is backfilled and a new detonation pit/shothole is developed. Prior to backfilling, the pit is sampled, and depth and location of the pit is recorded.

The open burning of hazardous wastes is prohibited in the MTR. This treatment prohibition does not apply to hazardous wastes that are burned for training purposes.

B. PERMITTED AND PROHIBITED WASTE

1. Permitted Hazardous Wastes

The Permittee shall only detonate the following wastes subject to the terms of this Permit and as described below:

Unserviceable, outdated, or obsolete munitions from MCAS Yuma. (Permit Attachment B provides a description of the types of wastes that have been treated at the MTR).

Table III-A - Treatment Quantities

Unit	Description of Hazardous Wastes	EPA Hazardous Waste Codes	Maximum Permitted Quantity
MTR	Ordnance	D001, D003, D008, D009, D030	1,000 lbs NEW/event 72,000 lbs NEW/year

2. Prohibited Hazardous Wastes

The Permittee shall not treat wastes that are not identified in Permit Condition III.B.1. Examples of these wastes include:

(a) Regulated infectious wastes, lethal or incapacitating chemical and biological munitions and their residues,

(b) Regulated nuclear radioactive materials,

(c) Wastes that cannot be detonated,

(d) Munitions that have a Net Explosive Weight (NEW) of more than 1,000 lbs. per open detonation or exceed 5,563 ft Explosive Safety Quantity Distance (ESQD) Arc for robust munitions.

(e) Free liquids,

(f) Shipping containers and ordnance packing materials,

(g) Hazardous Waste Nos. F020, F021, F022, F023, F026, F027, and

(h) Toxic Substances Control Act (TSCA)-regulated polychlorinated biphenyl (PCB) waste(s) subject to the disposal requirements of 40 C.F.R. Part 761 Subpart D.

C. DESIGN, CONSTRUCTION, AND OPERATING REQUIREMENTS

1. The Permittee shall perform OD operations in accordance with the Standard Operating Procedures (SOP) in Attachment A (Exhibit A-1) and Process Description contained in Permit Attachment C. The immediate area around the detonation shall be inspected after each event as soon as it is safe to do so. All detonation debris (metal casings and kick outs) will be collected from the ground and processed in accordance with Permit Attachment C. Permittee shall provide evidence of receipt of scrap metal by recycling facility, as applicable, in the Waste Management Performance Report per Permit Condition II.O.3.
2. The Permittee shall backfill the pit after it becomes too deep (i.e., it is unsafe to roll a bomb into, 10 feet or deeper), the pit is backfilled and a new detonation pit/shothole is developed. Pits will be sampled pursuant to the Soil Monitoring Plan (see Permit Attachment D, Exhibit D-2) at a frequency of no less than once per year.
3. Permittee shall not conduct operations during electrical/thunderstorms.
4. Munitions to be treated, including those received from offsite sources may be held at the MCAS Yuma ASP for a period not to exceed ten (10) days.
5. Permittee shall ensure that the material sent for recycling (e.g., scrap metal) will not have any hazardous waste associated with it.
6. Permittee shall conduct operations only during daylight hours.
7. Permittee shall ensure that only required personnel are present on the MTR when the detonation takes place.

D. HANDLING REQUIREMENTS

The Permittee shall perform OD operations in accordance with Permit Attachment E (Procedures to Prevent Hazards) and applicable United States Department of Defense (DOD), Naval Sea Systems Command (NAVSEA) and MCAS rules.

E. INSPECTION SCHEDULES AND PROCEDURES

The Permittee will follow the inspection requirements specified in Attachment E (Procedures to Prevent Hazards). The MTR will be regularly inspected to:

1. Ensure that no unauthorized personnel have trespassed within MTR boundaries;

2. Check the condition of all warning signs, boundary fences, and gates;

3. Maintain the overall readiness of the MTR;

4. Ensure the MTR's preparedness in the event of emergency; and

5. Check the condition of access and periphery roads.

Documentation of each inspection will be recorded in the MTR Inspection Checklist (Attachment E, Exhibit E-1). Security devices, including fences, signs, and gates will be inspected weekly. Range areas, including main and perimeter roads, gate area, flag poles, and periphery are inspected monthly. Communications equipment (radios and cellular/satellite phones) and safety and emergency equipment, such as fire extinguishers, first aid equipment and emergency crew shelters are inspected before and after each OD. After each inspection, the completed MTR Inspection Checklists are filed in the Operations and Inspection Log stored at the Station Environmental building.

All transportation and shipment of explosive ordnance shall follow the Navy's Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials (Attachment B, Exhibit B-7). The Explosive Ordnance Disposal (EOD) crew assigned to each truck will clean and service it at the end of each day's operations. Additionally, they will draw and stow any required replacement hardware, such as chains or shovels, and inform the Officer in Charge (OIC) of any expenditures. If a vehicle breakdown occurs during operations, the crew will report it to the OIC for a call to mobile maintenance.

If inspections reveal that non-emergency maintenance is needed at the MTR, then Station Environmental personnel will initiate immediate action(s) to preclude further damage and to reduce the need for emergency repairs. If a hazard is imminent or has already occurred during the course of an inspection, or any time between inspections, then remedial action will immediately be taken in accordance with the Contingency Plan (Attachment F). Appropriate authorities will be notified according to the Contingency Plan. In the event of an emergency involving the release of hazardous constituents to the environment, efforts

will be directed towards containing the hazard, removing it, and subsequently decontaminating the affected area as outlined in the Contingency Plan.

F. PREVENTION OF UNINTENDED IGNITION OR REACTION OF WASTES

All explosive wastes are kept from sources of ignition or reaction. EOD personnel trained to be very familiar with OD procedures, further minimize the chance for accidental ignition or reaction of wastes.

In transporting explosive ordnance for treatment at the MTR, certain precautions are to be taken to ensure that ignition or reaction of wastes is prevented. The reactive wastes will be packaged securely, segregated by separating incompatible items, secured on vehicles and transported according to United States Department of Transportation (DOT) regulations and the Navy's Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials (Attachment B, Exhibit B-7). Incompatible wastes are not to be mixed for transportation to the MTR or during pre-OD staging at the MTR.

The Permittee shall employ the following safety measures to ensure that the explosive waste does not ignite or detonate except during controlled treatment operations:

1. Smoking shall not be allowed at the MTR.

2. Only non-sparking tools will be used.

G. CLOSURE

The Permittee shall follow the final closure plan for the MTR found in Permit Attachment H (as modified prior to final closure -- see Permit Condition II.K).

H. FLOOD PLAIN RESTRICTIONS

The Federal Emergency Management Agency (FEMA) has performed a flood insurance study for the MTR, and the Flood Insurance Rate Map (FIRM) provided by FEMA, shows that the Annual Chance Flood Hazard for the MTR is 0.2 percent throughout the entire site boundaries (Attachment A, Figure A-5). Therefore, no flood plain restrictions apply to the site.

PART IV – CORRECTIVE ACTION SCHEDULE OF COMPLIANCE

A. AUTHORITY

RCRA Section 3004(u), as amended by the Hazardous and Solid Waste Amendments (HSWA), and A.A.C. R18-8-264.A (40 CFR 264.101 and 40 CFR 264, Subpart S) requires that Permits issued after November 8, 1984, address corrective action for releases of hazardous waste and hazardous waste constituents from any Solid Waste Management Unit (SWMU) at the facility, regardless of when the waste was placed in the unit.

Past releases have been comprehensively investigated by the Permittee, and these releases have been determined to not pose a threat to human health or the environment. A determination of No Further Action has been made by ADEQ for such past releases of hazardous waste and hazardous waste constituents. Due to the likely deposition of hazardous constituents in and around an OD unit, the area meets the designation as a SWMU and will be subject to site investigation, characterization and, as necessary, remediation of contaminated soils during closure under this Part, as well as PC II.K, (General Closure Requirements), and the Closure Plan (Attachment H). Should the Permittee discover a new SWMU or an area of concern (AOC) at the facility, or determine that a release has occurred, the facility will be governed by the conditions of this Permit Part (hereinafter referred to as the "Corrective Action Schedule of Compliance" or "CASOC").

B. GENERAL CORRECTIVE ACTION REQUIREMENTS

1. Record Keeping

   In accordance with Permit Condition I.E.9 (Monitoring and Records), all raw data, such as laboratory reports, drilling logs, bench-scale or pilot-scale data, and other supporting information gathered or generated during activities undertaken pursuant to this CASOC shall be maintained at the facility during the term of this Permit.

2. Reporting, Notifications and Submittals

   (a) The Permittee shall submit to the Director signed annual progress reports of all activities (i.e., SWMU Assessment, Interim Corrective Measures, RCRA Facility Investigation, Corrective Measures Study, Corrective Measures Implementation) conducted pursuant to the provisions of this CASOC, beginning no later than (90) calendar days after the Permittee is first required to begin implementation of any requirement herein. These reports shall contain:

(i) A description of the work completed;

(ii) Summaries of all problems or potential problems encountered during the reporting period and actions taken to correct the problems; and

(iii) Projected work for the next reporting period with a detailed schedule for this work.

(b) Copies of other reports (e.g., inspection reports), drilling logs and laboratory data shall be made available to the Director upon request.

(c) The Director may require the Permittee to conduct new or more extensive assessments, investigations, or studies, as needed, based on information provided in these progress reports or other supporting information. These assessments, investigations or studies may be required following review of the Permittee's RCRA Facility Investigation Reports, Corrective Measures Study Work Plan (see Permit Condition IV.G.3), or Corrective Measures Study Report (see Permit Condition IV.G.6), or Corrective Measures Implementation Program Plan (See Permit Condition IV.I), which will be submitted as Class 1* Permit Modification request (C1* PMR) requiring Director approval.

(d) The Permittee shall ensure that all plans, reports, notifications, and other submissions to the Director required by this Permit are signed, certified, and submitted in accordance with Permit Condition I.C (Permit Actions), Permit Condition I.J (Signatory and Certification Requirements), and other applicable conditions. Technical work submitted to the Director shall be stamped by a professional Geologist and/or Engineer, as appropriate, registered in the State of Arizona.

3. Contamination that has Migrated Beyond the Facility Boundary, if Applicable

The Permittee shall implement corrective actions beyond the Facility boundary where necessary to protect human health and the environment, unless the Permittee demonstrates to the satisfaction of the Director that, despite the Permittee's best efforts, as determined by the Director, the Permittee was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the Facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis. Any determination by the Director requiring the Permittee to address such releases be made as a C1* PMR requiring the Director's approval.

4. Quality Assurance and Control

When performing Corrective Action, the Permittee shall follow the guidance specified below for any sampling and sampling testing:

(a) Sample Collection and Management

A sampling plan submitted by the Permittee shall include all elements of EPA SW-846, and A.A.C. R18-8-260 et seq. (40 CFR Part 260 et seq.), not limited to:

(i) Specifying the sampler and sampler procedure for use;

(ii) Specifying sampling points based on a statistical basis, logic, and strategy;

(iii) Trip blanks, duplicates, spikes, splits, and other field control samples; and

(ii) Sample management, procedures for maintaining the field notebook, sample collection form(s), sample containers and preservatives used, and other chain-of-custody components.

(b) Laboratory Analysis and Chain-of-Custody

Throughout all sample analysis activities, the Permittee shall ensure the use of Director-approved quality assurance, quality control, and chain-of-custody procedures. In addition, the Permittee shall:

(i) Inform the Director's Project Coordinator which laboratories will be used by the Permittee.

(ii) Ensure that all laboratories used by the Permittee for its analyses participate in a quality assurance/quality control program equivalent to that described in EPA SW-846. As part of such a program, and upon request by the Director, such laboratories shall perform analyses of a reasonable number of known samples provided by the Director to demonstrate the quality of the analytical data.

(iii) Ensure that the laboratory used is licensed by the Arizona Department of Health Services (ADHS) to perform the specific analyses for the specific analyte(s) of concern.

(c) Evaluation of Sampling Data

The Permittee shall ensure that sampling plans contain provisions for review of all field and laboratory QA/QC notes and results, and shall use EPA SW-846 to evaluate all data developed in compliance with this Permit. Sampling plans must demonstrate the use of representative samples and must include parameters sufficient to identify migration of hazardous waste and hazardous constituents to the environment.

5. Project Coordinator

The Permittee will assign a Project Coordinator within 30 days of a written request by ADEQ. The Permittee's Project Coordinator shall be responsible for overseeing the implementing of corrective action at the Facility in accordance with this Part of

the Permit and for designating a person to act in his/her absence. ADEQ will also designate a Project Coordinator. All communications between the Permittee and ADEQ, and all documents, reports, approvals, and other correspondence concerning the activities performed pursuant to this Permit shall be directed through the Project Coordinators. The Permittee must provide at least seven (7) calendar days written notice to ADEQ prior to changing the Project Coordinator.

C. NOTIFICATION AND ASSESSMENT OF NEWLY IDENTIFIED SWMU(s) OR AOC(s)

1. Notification of Newly Identified SWMU(s) or AOC(s)

The Permittee shall notify the Director in writing of any newly identified SWMUs or AOCs (i.e., a unit not specifically identified during the RFA), discovered during the course of field investigations, environmental audits, or other means, no later than fifteen (15) calendar days after its discovery. The notification shall include, at a minimum, the location of the SWMU or AOC and all available information pertaining to the nature of the release (e.g., media affected, hazardous constituents released, magnitude of release).

2. Request for SWMU Assessment Plan

After such notification, the Director may require that the Permittee prepare a written SWMU Assessment Plan and a proposed schedule of implementation and completion of the SWMU Assessment Plan for any additional SWMU(s) or AOC(s) discovered subsequent to the issuance of this Permit. This plan will be submitted as a C1* PMR requiring Director approval.

3. Content and Submittal of SWMU Assessment Plan

Within sixty (60) calendar days after receipt of the Director's request for a SWMU Assessment Plan, the Permittee shall prepare and submit a SWMU Assessment Plan for evaluating past and present operations at the unit, as well as any sampling and analysis of groundwater, land surface and subsurface strata, and surface water or air, as necessary to assess whether a release of hazardous waste including hazardous constituents from such unit(s) occurred, is likely to have occurred, or is likely to occur. The SWMU Assessment Plan must demonstrate that the sampling and analysis program, if applicable, is capable of yielding representative sampling and must include parameters sufficient to identify migration of hazardous waste including hazardous constituents from the newly discovered SWMU(s) to the environment.

4. Review and Approval or Disapproval of SWMU Assessment Plan

After the Permittee submits the SWMU Assessment Plan, the Director shall either approve or disapprove the SWMU Assessment Plan in writing. If the Director disapproves of the SWMU Assessment Plan, the Director shall either:

(a) Notify the Permittee in writing of the SWMU Assessment Plan deficiencies and specify a due date for submittal of a revised SWMU Assessment Plan, or

(b) Revise the SWMU Assessment Plan and notify the Permittee of the revisions. The Director-revised SWMU Assessment Plan becomes the approved SWMU Assessment Plan, and constitutes the approval of the C1* PMR specified in Condition C.2 above.

(c) The approved SWMU Assessment Plan shall be incorporated into Permit Attachment J (CASOC - Approved Work Plans and Reports).

5. Implementation of the SWMU Assessment Plan

The Permittee shall implement the SWMU Assessment Plan within fifteen (15) calendar days of receiving written approval.

6. Content and Submittal of SWMU Assessment Report

The Permittee shall submit a SWMU Assessment Report (SAR) to the Director no later than forty-five (45) calendar days from completion of work specified in the approved SWMU Assessment Plan. The Report will be submitted as a C1* PMR requiring Director approval. The SAR shall describe all results obtained from the implementation of the approved SWMU Assessment Plan. At a minimum, the SAR shall provide the following information for each newly identified SWMU:

(a) The location of the newly identified SWMU in relation to other SWMUs;

(b) The type and function of the unit;

(c) The general dimensions, capacities, and structural description of the unit, including any available drawings;

(d) The period during which the unit was operated;

(e) The specifics on all wastes that have been or are being managed at the SWMU, to the extent available; and

(f) The results of any sampling and analysis required for the purpose of determining whether releases of hazardous waste including hazardous constituents have occurred, are occurring, or are likely to occur from the unit.

7. SAR Approval and Determination of Further RFI Action

(a) Based on the results of the SAR, the Director shall determine the need for further investigations at specified unit(s) covered in the SWMU Assessment, and may require the Permittee to prepare an RCRA Facility

Investigation (RFI) Work Plan or a Site Assessment Plan (SP) [see Permit Condition IV.J (Site Assessment and Remedy)] for such investigations. If the Director determines that investigations are needed, the Director shall incorporate his determination into the SAR approval. The SAR and SAR Approval shall constitute approval of the Permittee's C1* PMR. The final approved SAR shall then be incorporated into Permit Attachment J (CASOC - Approved Work Plans and Reports).

(b) The RFI Work Plan or SP described in Permit Condition IV.C.7.(a) will be reviewed for approval pursuant to Permit Condition IV.F (RCRA Facility Investigation Work Plan and Reports) or Permit Condition IV.J (Site Assessment and Remedy), as specified by the Director. The RFI Work Plan will be submitted as a C1* PMR, requiring Director approval.

D. NEWLY DISCOVERED RELEASES AND THREATS TO HEALTH AND THE ENVIRONMENT

1. Notification Requirements

The Permittee shall notify the Director, in writing, of any release(s) of hazardous waste, including hazardous constituents, discovered during the course of groundwater monitoring, field investigation, environmental auditing, or other activities undertaken after commencement of the RFI or the SP [see Permit Condition IV.J (Site Assessment and Remedy)], no later than fifteen (15) calendar days after their discovery. Such newly discovered releases may be from newly identified units, from units for which, based on the findings of the RFA, the Director had previously determined that no further investigation was necessary, or from units investigated as part of RFI or the SP.

In the event the Permittee identifies a current and/or potential threat to human health or the environment, the Permittee shall immediately notify the Director orally, and in writing within seven (7) calendar days, summarizing immediacy and magnitude of these threats.

2. Interim Measures for Current or Potential Threats

Within forty-five (45) calendar days of notifying the Director, the Permittee shall submit to the Director for approval an Interim Measures (IM) Work Plan, pursuant to Permit Condition IV.E (Interim Measures) that identifies interim measures which mitigate this threat and are consistent with, and integrated into, any long-term solution at the facility. The Work Plan shall be submitted as a C1* PMR, requiring Director approval. The approved IM Work Plan constitutes approval of the C1* PMR. The approved IM Work Plan shall be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports).

3. Further Investigations

The Director may require further investigation of newly identified release(s). A plan for such investigation will be submitted by the Permittee as a C1* PMR, requiring Director approval. The Plan shall be reviewed pursuant to Permit Condition IV.F (RCRA Facility Investigation Work Plan and Report) or Permit Condition IV.J (Site Assessment and Remedy), as specified by the Director.

E. INTERIM MEASURES

1. Determination that Interim Measures are Needed

If during the course of any activity initiated under this CASOC, the Director or Permittee determines that a release or potential release of hazardous waste, including hazardous constituents from a SWMU poses an actual, imminent, or potential threat to human health or the environment, the Director and Permittee may determine that interim measures are necessary. Interim stabilization measures consistent with a final remedy may be deployed during ongoing investigations. The following factors should be considered in this determination:

(a) Time required to develop and implement a final remedy;

(b) Actual and potential exposure to the environment (e.g., animals, ecosystems) and/or human receptors;

(c) Actual and potential contamination of drinking water supplies and sensitive ecosystems;

(d) Potential for further degradation of the medium absent interim measures;

(e) Presence of hazardous waste in containers that may pose a threat of release;

(f) Presence and concentration of hazardous waste, including hazardous constituents, in soil having potential to migrate to ground or surface water;

(g) Weather conditions that may affect the current levels of contamination;

(h) Risks of fire, explosions, or accident; and

(i) Other situations that may pose threats to human health and the environment.

2. Specifying Interim Measures and Actions

(a) When it is determined that interim measures are needed, an Interim Measures (IM) Work Plan shall be developed that will include, but not be limited to, the following elements:

(i) What interim measures need to be taken;

(ii) Specific action(s) that must be taken to implement the interim measure;

(iii) Schedule for their implementation; and

(iv) Parameters or measurements by which to judge the completion of the measures.

(b) Either the Director or the Permittee shall develop the IM Work Plan as follows:

(i) The Director may notify the Permittee in writing of the requirement to perform specific interim measures. If the Permittee concurs, The Permittee shall begin to implement the interim actions within fifteen (15) calendar days after receiving notification. The Director shall modify the CASOC according to Permit Condition Part I.H (Permit Modifications). Interim Measures do not require a public comment period until the measures are incorporated into the Corrective Measures Study (CMS) Work Plan and Report described in Condition IV.G of this Permit.

(ii) The Director may notify the Permittee in writing that the Permittee is required to develop an IM Work Plan. In this event, the Permittee shall submit the IM Work Plan within thirty (30) calendar days after request. The IM Work Plan shall be submitted as a C1* PMR, requiring Director approval.

3. Review and Approval or Disapproval of IM Work Plan

After the Permittee submits the IM work plan, the Director shall either approve or disapprove the IM Work Plan in writing. If the Director disapproves the IM Work Plan, the Director shall either:

(a) Notify the Permittee in writing of the IM Work Plan's deficiencies and specify a due date for submittal of a revised Plan, or

(b) Revise the IM Work Plan (this revised Work Plan becomes the approved IM Work Plan) and notify the Permittee of the revisions. The approved IM Work Plan constitutes approval of the C1* PMR specified in Permit Condition IV.E.2(b)(ii). The final approved IM Work Plan shall then be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports).

4. Implementation of the IM Work Plan

The Permittee shall implement interim actions within fifteen (15) calendar days after receiving approval or notification of any revisions requested by the Director.

F. RCRA FACILITY INVESTIGATION WORK PLAN AND REPORTS

1. Submittal of RFI Work Plan

RFI Work Plans may be required at any time in the future in order to determine potential or actual impacts on human health and the environment.

2. Content and Submittal of RFI Work Plan

Within sixty (60) days after receiving a request from the Director, the Permittee shall submit a complete RFI Work Plan to the Director. The RFI Work Plan shall be submitted as a C1* PMR, requiring Director approval. The Work Plan shall address in detail SWMUs, releases of hazardous waste, hazardous constituents, and media of concern which require further investigations.

(a) The Work Plan shall describe the objectives of the investigation and the overall technical and analytical approach to completing all actions necessary to characterize the nature, direction, rate, movement, and concentration of releases of hazardous waste (including hazardous constituents) from specific units or groups of units, and their actual or potential receptors. The Work Plan shall detail all proposed activities and procedures to be conducted at the facility, the schedule for implementation and completion of such investigation(s), the qualifications of personnel performing or directing the investigation(s), including contractor personnel, and the overall management of the RFI.

(b) The Plan shall discuss sampling and data collection quality assurance and data management procedures listed in Permit Condition IV.B.4 (Quality Assurance and Control), including formats for documenting and tracking data and other results of investigation, and health and safety procedures.

3. Review and Approval or Disapproval of RFI Work Plan

The Director shall review the RFI Work Plan for proper content and those RFI Work Plan elements applicable to the facility. After review, the Director will either approve or disapprove the RFI Work Plan in writing. If the Director disapproves the RFI Work Plan, the Director shall either:

(a) Notify the Permittee in writing of the RFI Work Plan's deficiencies and specify a due date for submittal of a revised RFI Work Plan; or

(b) Revise the RFI Work Plan and notify the Permittee of the revisions. This modified RFI Work Plan becomes the approved RFI Work Plan and constitutes approval of the C1* PMR in Permit Condition IV.F.2.

The Director shall also review for approval as part of the RFI Work Plan any plans developed addressing further investigations of newly identified SWMUs (Permit Condition IV.D.

If approved, the RFI Work Plan will be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports). If the Director approves the RFI Work Plan, the Permittee shall, within ninety (90) calendar days of receipt of approval, send a Class 1 Permit Modification notice to all individuals on the facility mailing list maintained by the Director in accordance with R18-8-270.A (40 CFR 270.42(a)(1)(ii)) and 270.I(c)(1)(ix) and (x) [40 CFR 124.10(c)(1)(ix) and (x)]. The notice shall include a summary of the approved RFI Work Plan and describe the change made to Permit Attachment J (CASOC – Approved Work Plans and Reports).

4. Implementation of RFI Work Plan

No later than thirty (30) calendar days after the Permittee has received written approval from the Director for the RFI Work Plan, the Permittee shall begin implementing the RFI according to the schedules and procedures specified in the RFI Work Plan.

5. Content and Submittal of RFI Interim or Final Report

Within sixty (60) calendar days after the completion of the RFI Work Plan or other schedule approved by the Director, the Permittee shall submit:

(a) RFI Interim or Final Report

An RFI Interim or Final Report shall be submitted as a C1* PMR, requiring Director approval. The RFI Interim or Final Report shall describe the procedures, methods, and results of all facility investigation(s) of SWMUs and their releases, including information on the type and extent of contamination at the facility, sources and migration pathways, and actual or potential receptors. The RFI Interim or Final Report shall present all information gathered under the approved RFI Work Plan. The RFI Interim or Final Report must contain adequate information to support further corrective action decisions at the facility.

(b) Determination of No Further Actions with Modification

Based on the results of the RFI and other relevant information, the Permittee may submit an RFI-Based Determination of NFA with a proposed Class 3 Permit modification request (C3 PMR) to the Director requesting termination of any Corrective Action Required. The NFA Determination and proposed C3 PMR will be processed pursuant to requirements of Permit Condition Part I.H and must contain information demonstrating that there are no releases of hazardous wastes (including hazardous constituents) from

SWMUs at the facility that pose a threat to human health and the environment. It must also include information required in A.A.C. R18-8-270.A (40 CFR 270.42(c), which incorporates by reference 40 CFR 270.13 through 270.21, 270.62, and 270.63), and state whether:

(i) Contamination is found to be non-existent;

(ii) Contaminant levels and subsequent risks are insignificant compared to existing background levels (i.e. levels are naturally occurring);

(iii) Contamination results from releases originating from outside the facility;

(iv) Groundwater is neither a current or potential source of drinking water, impacts potentially vulnerable Class I ground waters, nor is potentially usable for other human purposes; or

(v) Contamination is located adjacent to industrialized, non-residential areas.

6. Review and Approval or Disapproval of RFI Interim or Final Report

The Director shall review the RFI Interim or Final Report submittal (and NFA Determination, if applicable), and either approve or disapprove the Report and NFA Determination in writing.

(a) If the Director disapproves the RFI Report, the Director shall notify the Permittee in writing of the Report's deficiencies and specify a due date for submittal of the revised Report.

(b) RFI Interim or Final Report without NFA Determination: If the Director approves the Report, the approval constitutes approval of the Permit Modification request of Condition IV.F.5(a). The Permittee shall, within ninety (90) calendar days of receipt of approval, send a Class 1 Permit Modification notice to all individuals on the facility mailing list maintained by the Director in accordance with R18-8-270.A (40 CFR 270.42(a)(1)(ii)) and 270.I(c)(1)(ix) and (x) [40 CFR 124.10(c)(1)(ix) and (x)]. The notice shall include a summary of the approved RFI Interim or Final Report and describe the change made to Permit Attachment J (CASOC – Approved Work Plans and Reports).

(c) RFI Interim or Final Report with NFA Determination: If, based upon review of the Permittee's NFA Determination and proposed C3 PMR, the results of the RFI, and other information (including comments received during the public comment period), the Director determines that releases or suspected releases which were investigated either are non-existent or do not pose a threat to human health and the environment, the Director may grant the requested modification. However, the NFA approval does not preclude the Director from initiating other modifications to the CASOC according to

procedures in 40 CFR 270.41 (Director-initiated Permit Modifications) that may rescind the determination or require the Permittee to perform:

(i) Continued or periodic monitoring of air, soil, groundwater, or surface water, when site-specific circumstances indicate that releases of hazardous wastes (including hazardous constituents) are likely to occur, if necessary to protect human health and the environment;

(ii) Further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates a release or likelihood of a release from a SWMU is likely to pose a threat to human health or the environment.

Upon approval of the RFI Interim or Final Report with NFA Determination and C3 PMR, the RFI Interim or Final Report and NFA Determination will be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports).

G. CORRECTIVE MEASURES STUDY (CMS) PLAN AND REPORT

1. Call-in of the Corrective Measures Study

For newly-identified SWMUs: If the Director has reason to believe, after review of the RFI Final Report, that a SWMU has released concentrations of hazardous constituents in excess of any action level, or determines that contamination present at levels below those action levels pose a threat to human health and the environment given site specific exposure conditions, the Director may require a C1* PMR for a CMS, and shall so notify the Permittee in writing.

2. Content and Submittal of CMS Plan

The Permittee shall submit a C1* PMR requiring Director approval and a CMS Work Plan to the Director within forty-five (45) calendar days after notification of the requirement to conduct a CMS. The CMS Plan shall provide the following information:

(a) Description of general approach to investigate and evaluate potential remedies;

(b) Definition of the overall study objectives;

(c) The specific plans and factors for evaluating remedies to ensure compliance with remedy standards, as stated in Permit Condition IV.H (Remedy Selection);

(d) The schedules for conducting the study; and

(e) Proposed format for presentation of the information.

(f) An assessment of the existing data and the additional data needed to evaluate the feasibility of all proposed corrective actions.

3. Review and Approval or Disapproval of CMS Plan

The Director should review the CMS Plan to ensure it contains all necessary contents.

(a) If the Director disapproves the CMS Plan, the director shall either:

(i) Notify the Permittee in writing of the Plan's deficiencies and specify a due date for submittal of a revised Plan, or

(ii) Revise the CMS Plan and notify the Permittee of the revisions. This modified CMS Plan becomes the approved CMS Plan.

(b) If the Director approves the CMS Work Plan, the Permittee shall, within ninety (90) calendar days of receipt of approval, send a Class 1 Permit Modification notice to all individuals on the facility mailing list maintained by the Director in accordance with R18-8-270.A (40 CFR 270.42(a)(1)(ii)) and 270.I(c)(1)(ix) and (x) [40 CFR 124.10(c)(1)(ix) and (x)]. The notice shall include a summary of the approved CMS Work Plan and describe the change made to Permit Attachment J (CASOC – Approved Work Plans and Reports).

4. Implementation of CMS Plan

No later than fifteen (15) calendar days after the Permittee has received written approval from the Director for the CMS Work Plan, the Permittee shall implement the CMS Work Plan according to the schedules and procedures specified in the CMS Work Plan.

5. Content and Submittal of CMS Final Report

Within sixty (60) calendar days after the completion of the CMS tasks, the Permittee shall submit a C1* PMR requiring Director approval and the CMS Report. The CMS Report must contain adequate information to support the Director in the remedy selection decision-making process and shall include, at a minimum:

(a) A summary of results of investigations, and any bench-scale or pilot tests conducted for each remedy studied. The CMS Report shall include all data needed to evaluate the feasibility of the proposed corrective measures or propose additional data collection efforts necessary to evaluate corrective measures;

(b) A description and evaluation of each remedial alternative which passed through the initial screening of corrective measure technologies;

(c) All information gathered under the approved CMS Plan with Performance standards streamlined;

(d) The recommended corrective measure(s), and a justification for selection of the recommended corrective measure(s).

6. Review and Approval of CMS Final Report and Remedy

The Director shall approve, approve with modifications, or disapprove the draft CMS Report and will advise the Permittee of the determination in writing. The Director shall select the remedy according to Permit Condition IV.H (Remedy Selection). In all cases, the Director may require the Permittee to evaluate additional remedies or particular elements of the proposed remedies.

(a) If the Director disapproves the CMS Report, the Director shall notify the Permittee in writing of deficiencies in the CMS Report and specify a due date for submittal of a revised CMS Report.

(b) If the Director approves or approves with modifications the CMS Report, the approved CMS Report constitutes approval of the C1* PMR of Permit Condition IV.G.5. The CMS Report will be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports). If the Director approves the CMS Report, the Permittee shall, within ninety (90) calendar days of receipt of approval, send the Class 1 Permit Modification notice to all individuals on the facility mailing list maintained by the Director in accordance with R18-8-270.A (40 CFR 270.42(a)(1)(ii)) and 270.I(c)(1)(ix) and (x) [40 CFR 124.10(c)(1)(ix) and (x)]. The notice shall include a summary of the approved CMS Report and describe the change made to Permit Attachment J (CASOC – Approved Work Plans and Reports).

(c) Within forty-five (45) calendar days of receipt of the Director's approval, or approval with modifications, of the proposed corrective measure(s), the Permittee shall submit a CMI Program Plan for the remedy selected pursuant to Permit Condition IV.I (Corrective Measures Implementation Program Plan).

H. REMEDY SELECTION

1. Remedy Standards

Based on results of the CMS and any further evaluations of additional remedies, the Director shall select a remedy from the remedial alternatives evaluated in the CMS that will protect human health and the environment; meet the concentration levels of hazardous constituents in each medium that the remedy must achieve to be protective of human health and the environment; control the course(s) of the release(s) so as to reduce or eliminate, to the maximum extent practicable, further

releases that might pose a threat to human health and the environment; and meet all applicable waste management requirements.

2. Technical Evaluation Factors of Remedy

In approving the recommended remedy(s) which meets the standards for remedies established above, the Director shall consider the following evaluation factors, as appropriate:

(a) Long-term reliability and effectiveness

To establish the degree of certainty that the remedy will prove successful, evaluate the:

(i) Magnitude of residual risks in terms of amounts and concentrations of waste remaining following remedy implementation, considering the persistence, toxicity, mobility and propensity for bio-accumulation of such hazardous wastes including hazardous constituents;

(ii) Type and degree of long-term management required, including monitoring, operation and maintenance;

(iii) Exposure potential of humans and environmental receptors to remaining wastes, considering potential threats to human health/environment associated with excavation, transportation, re-disposal or containment;

(iv) Long-term reliability of the engineering and institutional controls, including uncertainties associated with land disposal of untreated wastes and residuals;

(v) Potential need for replacement of the remedy.

(b) Reduction of toxicity, mobility, and volume

The degree to which a potential remedy employs treatment that reduces toxicity, mobility, or volume of hazardous wastes (including hazardous constituents) that shall be considered include:

(i) The treatment processes the remedy(s) employs and materials it would treat;

(ii) Amount of hazardous wastes (including hazardous constituents) that would be destroyed or treated;

(iii) The degree to which the treatment is irreversible; and

(iv) The residuals that will remain following treatment, considering the persistence, toxicity, mobility and propensity for bio-accumulation of such hazardous wastes (including hazardous constituents).

(c) Short-term effectiveness.

Assess potential remedy(s) for short-term effectiveness considering:

(i) Magnitude of reduction of existing risks;

(ii) Short-term risks that might be posed on the community, workers, or environment during implementation of such remedy, including potential threats to human health and the environment associated with excavation, transportation, re-disposal or containment; and

(iii) Time until full protection is achieved.

(d) Implementability.

The ease or difficulty of implementing a potential remedy(s) may be assessed by considering the following types of factors:

(i) Degree of difficulty associated with constructing or implementing the technology;

(ii) Expected operational reliability of the technologies;

(iii) Need to coordinate/obtain necessary approvals and permits from other agencies;

(iv) Availability of necessary equipment and specialists; and

(v) Available capacity, location of needed treatment, storage and disposal services.

(e) Cost.

The types of costs assessed include:

(i) Capital, and Operation and Maintenance costs;

(ii) Net present value of capital and operation and maintenance costs; and

(iii) Potential future remedial action costs.

I. CORRECTIVE MEASURES IMPLEMENTATION PROGRAM PLAN

1. Content and Submittal of CMI Program Plan

Within forty-five (45) calendar days after receipt of the Director's Remedy Selection, the Permittee shall submit a C1* PMR, requiring Director approval and a draft Corrective Measures Implementation (CMI) Program Plan. All Corrective Action requirements of 40 CFR 264.99(h) and 264.100 shall be addressed, not limited to:

(a) CMI Work Plan Description

Details of specific remedies (i.e. remove-and-treat or treat-in-place) to be taken which achieve compliance with the standards, and a description of

remedy's technical features that are necessary to achieve the standards, not limited to:

(i) Requirements for quality sampling and analysis; including a plan for CMI groundwater monitoring that demonstrates an effective post-closure compliance or assessment monitoring program;

(ii) Requirements and proposals for public involvement;

(iii) Requirements for removal, decontamination, closure, or post-closure of units, equipment, devices or structures used to implement remedy;

(iv) Requirements for achieving compliance with concentration limits and levels.

(b) Corrective Measures Design

Details of the remedy's design, but not limited to:

(i) Specific design criteria of remedial system(s);

(ii) Related diagrams; and

(iii) Required permits.

(c) Corrective Measures Construction

Details of the construction of the specific remedies, but not limited to:

(i) Construction and test plans of systems;

(ii) Construction diagrams;

(iii) Additional well installations; and

(iv) Inspections.

(d) Operation and Maintenance Plan

Specific operation and maintenance requirements and details, but not limited to:

(i) Personnel training;

(ii) Start-up procedures;

(iii) Operation and maintenance procedures;

(iv) Applicable drawings and diagrams; and

(v) Waste management practices.

(e) Monitoring

Specific monitoring requirements for the corrective measures system(s), including for monitoring wells, but not limited to:

(i) Sampling plans;

(ii) Data collection and analysis; and

(iii) Schedules, and corrective measure completion criteria.

(f) Standards

Basic standards including, but not limited to:

(i) Hazardous constituents list;

(ii) All concentration levels or limits of hazardous constituents in each medium (i.e. soil, groundwater) that the remedy must achieve to protect human health and environment;

(iii) Compliance points and compliance period;

(iv) Management of hazardous waste.

(g) Schedule

A schedule for initiating and completing all major technical features and milestones of remedy, and required length of Corrective Actions taken, including when CMI groundwater monitoring is initiated in lieu of post-closure groundwater compliance or assessment monitoring;

(h) Reporting

Requirements for submission of semi-annual reports, completion reports, other information, and modifications if above regulations cannot be met.

2. Review and Approval or Disapproval of CMI Program Plan

The Director shall approve, approve with modifications, or disapprove the draft CMI Plan and will advise the Permittee of its determination in writing.

(a) If the Director disapproves of the CMI Program Plan, the Director shall notify the Permittee in writing of deficiencies in the CMI Program Plan and specify a due date for submittal of a revised CMI Program Plan thirty (30) calendar days after notification.

(b) If the Director approves (or approves with modifications) the CMI Program Plan, the CMI Program Plan will be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports). If the Director approves the CMI Program Plan, the Permittee shall, within ninety (90) calendar days of receipt of approval, send the C1* PMR notice to all individuals on the facility mailing list maintained by the Director in accordance with R18-8-270.A and 270.I(c)(1)(ix) and (x) [40 CFR 124.10(c)(1)(ix) and (x)]. The

notice shall include a summary of the approved CMI Program Plan and describe the change made to Permit Attachment J (CASOC – Approved Work Plans and Reports). The Director's approval of the CMI Program Plan constitutes approval of the C1* PMR.

(c) Within forty-five (45) calendar days of receipt of Director's approval, or approval with modifications, of the proposed corrective measure(s), the Permittee shall submit to the Director a final CMI Program Plan consistent with the Director's written notification.

3. Implementation of CMI Program Plan

No later than fifteen (15) calendar days after the Permittee has received written approval from the Director for the CMI Program Plan, the Permittee shall begin to implement the CMI Program Plan according to the schedules and procedures specified in the CMI Program Plan.

J. SITE ASSESSMENT AND REMEDY

Site Assessment and Remedy may be required to assess and possibly remedy sites consisting of suspected historic releases of small area extent and for which no groundwater contamination has occurred or threatens to occur. Site Assessment and Remedy shall consist of a Site Assessment Plan (SP) and, if necessary, a Remedial Plan (RP). At the Director's discretion the Permittee may be required to follow the provisions of the RFI, CMS, and CMI processes (Permit Conditions IV.F through IV.I) if, during performance of the SP or RP, extensive contamination is found, or if it is found that groundwater may be impacted by the historic release.

1. Site Assessment Plan

Any SP submitted by the Permitted shall be submitted as a C1* PMR requiring Director approval. The SP shall contain the following:

(a) A description of the purpose for the SP

(b) A general description of the site including a site diagram or drawing. Identify as applicable:

(i) property boundaries;

(ii) buildings and fences;

(iii) process and maintenance areas;

(iv) active and inactive waste generation, handling treatment, storage, disposal, and spill areas;

(v) water wells, dry wells, sumps, storm sewers, industrial and sanitary sewers, septic tanks, surface waters (including intermittent washes, discharges or irrigation ditches, canals, etc);

(vi) depth to ground water;

(vii) soil coverings (asphalt, concrete, vegetation, etc);

(viii) topography and drainage patterns

(c) Identity of each waste which has been stored, treated, or disposed at the site, and the identity of each hazardous constituent present in that waste.

(d) The method(s) used to determine sample locations and depths (random, systematic, biased, or combination) and a rationale for the number of samples taken.

(e) A diagram showing the number, type, and location of samples

(f) Detailed sampling procedures describing:

(i) Contents of the field notebook

(ii) Sampling equipment used

(iii) Sample sizes

(iv) Use of any sample compositing

(v) Sample containers, labels, and seals

(vi) Field and trip blanks

(vii) Sample preservatives

(viii) Quality assurance procedures (blind field duplicates, use of a check lab, and chain of custody)

(ix) Sample packaging and shipment

(x) Reserved samples (samples to be collected but not immediately analyzed)

(xi) Backfilling procedures for the sample borings

(xii) Equipment decontamination procedures, including disposal of spent solutions

(g) Analytical parameters and the rationale for choosing such parameters

(h) Provision for expanding the SP if contamination is found to have migrated

(i) Provision for the submittal of a Site Assessment Report within 90 days of completion of the implementation of the SP, providing the following information:

(i) A summary of results, significant observations, and conclusions.

(ii) A discussion of the sampling procedures followed for each site, including a description of:

a. The sampling procedures used;

b. The equipment used for sampling;

c. The analytical procedures and methods used;

d. The analytical equipment used; and

e. The quality assurance procedures used.

(iii) The procedures used to prevent hazards and protect field personnel;

(iv) The equipment used to prevent hazards and protect field personnel;

(v) Drawings and photographs where appropriate;

(vi) Description of any deviations from the approved SP;

(vii) Data generated from sampling and analysis activities performed pursuant to the plan, including field notes, manifests, bills of lading, LDR forms, laboratory submittal forms, chain-of-custody forms, laboratory reports, and drilling logs.

(j) Provision for the submittal of a RP, if any hazardous constituents are found above the applicable soil remediation standards of Title 18, Chapter 7, Article 2 or if any hazardous constituents may be expected to migrate to groundwater.

(k) Provision for a request of a Finding of No Further Action from the Director, if no hazardous constituents are found above the applicable soil remediation standards of Title 18, Chapter 7, Article 2, or if no hazardous constituents may be expected to migrate to ground water.

(l) The final approved SP shall be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports).

2. Remedial Plan

Any Remedial Plan (RP) submitted by the Permittee in accordance with Permit Section IV.J shall be submitted as a C1* PMR requiring Director approval. The RP shall contain the following:

(a) A description of the process to be used in the removal of all hazardous waste, hazardous waste constituents, and/or soils determined to be contaminated with hazardous waste or hazardous waste constituents;

(b) An estimate of the amount of waste or soils to be generated, including a site map indicating the location and vertical and horizontal extent of the area to be remediated;

(c) Identification of the personnel to be used during the remediation, including the name of the project officer who will be responsible for managing the site;

(d) A provision for a site safety plan which will be enforced during the remediation. At a minimum, the site safety plan should specify the precautions to be taken and monitoring to be performed which ensures the safety of the site workers and the surrounding community;

(e) The method(s) used to determine sample locations and depths (random, systematic, biased, or combination) and a rationale for the number of samples taken;

(f) A diagram showing the number, type, and location of samples to be taken;

(g) Detailed sampling procedures describing:

(i) Contents of the field notebook
(ii) Sampling equipment used
(iii) Sample sizes
(iv) Use of sample compositing
(v) Sample containers, labels, and seals
(vi) Field and trip blanks
(vii) Sample preservatives
(viii) Quality assurance procedures (blind field duplicates, use of a check lab, chain of custody)
(ix) Sample packaging and shipment
(x) Reserved samples (samples to be taken but not immediately analyzed)
(xi) Backfilling and grouting of sample borings
(xii) Equipment decontamination procedures, including disposal of spent solutions;

(h) Analytical parameters and the rationale for choosing such parameters;

(i) The chain of custody procedures to be followed;

(j) If the remediation may be expected to include the storage of hazardous waste or soils contaminated with hazardous constituents on-site, the storage method, location, and expected duration must be detailed. The description must specify the precautions to be taken to protect the facility and surrounding community from exposure to the waste or soils contaminated with hazardous constituents;

(k) If the remediation entails excavation, the steps which will be taken to limit access to the excavated area must be described;

(l) If the remediation entails the use of imported back-fill, provisions for documenting that the back-fill is clean;

(m) The decontamination procedures and disposal techniques to be employed for all decontaminated solutions and personal protective equipment;

(n) The disposal method and identification of the disposal site(s) of all hazardous wastes and contaminated soils generated during the remediation;

(o) A schedule for performance of the remedy, including provision for prior ADEQ notification (5 days);

(p) Provisions for amendment of the RP should confirmatory sampling indicate the presence of hazardous waste or hazardous waste constituents, ~~,~~ are found above the applicable soil remediation standards of Title 18, Chapter 7, Article 2 or if any hazardous constituents may be expected to migrate to groundwater;

(q) Documentation that the site has been "blue staked" prior to remediation;

(r) Provisions for the submittal of a Remedial Report within 90 days of completion of the remedy providing:

(i) A summary of results, significant observations, and conclusions.

(ii) A discussion of the sampling followed for each site, including a description of the:

a. sampling procedures used;

b. equipment used for sampling;

c. analytical procedures and methods used;

d. analytical equipment used;

e. quality assurance procedures used;

(iii) The procedures used to prevent hazards and protect field personnel;

(iv) The equipment used to prevent hazards and protect field personnel

(v) Drawings and photographs where appropriate

(vi) Description of any deviations from the approved RP.

(vi) Data generated from the remedy and confirmatory sampling and analysis activities performed pursuant to the RP, including field notes, manifests, bills of lading, LDR forms, laboratory submittal forms, chain-of-custody forms, laboratory reports, and drilling logs;

(vii) Summaries of all findings, including summaries of laboratory data.

(s) Provision for a request of a Finding of NFA from the Director, through a Class 1 Permit Modification request, if no hazardous constituents remain above the applicable soil remediation standards of Title 18, Chapter 7, Article 2, and if no hazardous constituents may be expected to migrate to ground water;

(t) The final approved RP shall be incorporated into Permit Attachment J (CASOC – Approved Work Plans and Reports).

3. Notification

Within thirty (30) calendar days of the submittal of the RP to the Director, the Permittee shall send a notice of the RP to all persons on the facility mailing list maintained by the Director in accordance with R18-8-270.A (40 CFR 270.42(a)(1)(ii)) and 270.I(c)(1)(ix) and (x) [40 CFR 124.10(c)(1)(ix) and (x)]. The notice shall briefly describe the RP and provide facility and ADEQ contacts.

PART V – GROUNDWATER MONITORING

A. GROUNDWATER MONITORING PLAN

The Permittee shall conduct groundwater monitoring, well field measurements, sampling, analysis, and reporting according to parameters and frequencies as specified in Attachment D, Exhibit D-1 (Groundwater Monitoring Plan [GWMP]). The Permittee shall use this GWMP, until revisions of these plans are approved by ADEQ as necessary to comply with the requirements of A.A.C. R18-8-264.A, 40 CFR 264.97 and 264.98. Revisions to these documents are considered modifications of this Permit pursuant to Permit Condition I.H.

1. Based on data collected from groundwater monitoring or other investigation results required by this Permit, the Director may require the Permittee to make changes to the GWMP as necessary in order to protect human health and the environment. Such changes may include the addition of monitoring wells or change to monitoring frequency.

   [A.A.C. R18-8-101 (40 CFR 264.98)]

2. If the Permittee believes the monitoring program no longer satisfies the requirements of the regulations, the Permittee shall, within 90 days of the determination, submit a Permit Modification request requiring the Director's approval, to make any appropriate changes to the program that will satisfy the regulations. The Permit Modification request shall be submitted in accordance with Permit Condition I.H.

   [A.A.C. R18-8-264.A (40 CFR 264.98)]

B. WELL LOCATIONS, INSTALLATION, AND CONSTRUCTION

The Permittee shall maintain a groundwater monitoring system to comply with applicable requirements of A.A.C. R18-8-264.A (40 CFR 264 Subpart F) and as specified below.

1. The Permittee shall maintain the groundwater monitoring well at the location displayed in Attachment D, Exhibit D-4. Well locations will be added based on methods and procedures approved by the Director. Wells may only be removed from the network or modified following the Director's written approval.

2. All wells removed from the groundwater monitoring system shall be abandoned in accordance with procedures approved by the Arizona Department of Water Resources. Well abandonment methods and certification shall be submitted to ADEQ within 90 days from the date the well is removed from the network.

3. Any changes to the GWMP must be made as a Permit Modification request, requiring the Director's approval, and submitted in accordance with Permit Condition I.H.

4. One groundwater monitoring well (MW) was installed at the MTR in January 2013 and was designated as MTR-MW-01. The well was installed in a downgradient location southeast of the MTR (see Attachment D, Exhibit D-4). The well construction diagram is provided in Attachment D, Exhibit D-6.

C. SAMPLING AND ANALYSIS

The Permittee shall follow the following techniques and procedures when obtaining and analyzing groundwater samples to provide a reliable indication of groundwater quality.

[A.A.C. R18-8-264.A (40 CFR 264.97(d) and (e)]

1. Groundwater samples shall be collected from the monitoring well identified in Attachment D, Exhibit D-4. Groundwater samples shall be collected, preserved, and shipped in accordance with the procedures specified in the GWMP.

2. Monitoring Frequency: For the annual sampling, the frequency of sample collection and the well to be sampled are in accordance with the GWMP. The frequency of groundwater monitoring sample collection shall be no less frequent than one event per year.

3. Groundwater samples shall be tracked and controlled using the chain-of-custody procedure specified in the GWMP.

4. Samples shall be analyzed according to the Sampling and Analysis Plan (Appendix B) of the GWMP or the most current final version of EPA Test Methods for Evaluating Solid Waste SW-846. For those constituents that have established Maximum Contaminant Levels (MCL), Preliminary Remediation Goals (PRG), or Arizona Health-Based Guidance Level (HBGL), the analytical method chosen must be capable of achieving a Practical Quantitation Limit (PQL) below the established MCL, PRG, or HBGL.

5. Depth to water level measurements will be collected once per two years at the monitoring and production well identified in Attachment D, Exhibit D-4. Water level measurements will be performed in accordance with the specifications in the GWMP.

D. REPORTING AND RECORDKEEPING

1. The Permittee shall enter all monitoring, testing, and analytical data obtained pursuant to this Permit in the operating record. The data must include all computations and data validation.

[A.A.C. R18-8-264.A (40 CFR 264.73(b)(6)]

2. On or before March 1 of the following year of when the sampling was performed the Permittee shall submit to ADEQ a groundwater and soil monitoring report (Report) providing water level and groundwater and soil quality data collected at

every sampling event. The Report shall provide an executive summary of each groundwater monitoring and soil event as well as detailed and comprehensive documentation of the groundwater monitoring activities. Detailed information to be contained in the Report shall include sections on project activities, analytical results summary, and recommendations. The project activities section will include project objectives, summary of groundwater and soil sampling activities, summary of laboratory analyses, and summary of data quality evaluation. The results section will include well gauging data, analytical results summary, and an evaluation of any potential human health risks. Comprehensive documentation, including the raw analytical data and the full data quality evaluation will be contained in appendices to the Report.

The Report will be prepared under the direction of a qualified professional (e.g. an Arizona registered professional engineer, geologist, or hydrogeologist) in accordance with Permit Condition I.J.

E. MANAGEMENT OF IDW

No Investigation Derived Waste (IDW) is anticipated to be generated during annual soil sampling and groundwater monitoring activities.

ATTACHMENT A
FACILITY DESCRIPTION

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ATTACHMENT A
Facility Description

The following subsections provide a general description of the BMGR and the MTR facility. The following description is intended to acquaint the permit application reviewer with an overview of the facility.

A.1 General Description

A.1.1 Barry M. Goldwater Range

The BMGR consists of a wedge-shaped area in the extreme southwestern corner of Arizona and lies within southern Yuma County and extends eastward into Maricopa and Pima Counties in southwestern Arizona (Figure A-1). Figure A-2 provides additional information on the shape and location of the BMGR. The BMGR is, and has been, an important facility for training pilots in aerial and air-to-ground combat since 1941. It is highly valued for its year-round flying weather and expansive, unencumbered air and land space that can accommodate a variety of military training needs. This combination of features is unequaled elsewhere in the continental United States. As urban and other development pressures force restrictions on the operation of military aircraft at other range locations, the BMGR will become increasingly vital to the nation's defense.

Acquisition of the BMGR for military aviation training purposes began in 1941, shortly before the United States entered World War II. Congress officially set aside 2.6 million acres of the BMGR with the 1986 Military Lands Withdrawal Act (MLWA) and designated it the Barry M. Goldwater Air Force Range under management of the United State Air Force (USAF). Congress extended authorization of the BMGR again and re-designated BMGR management responsibilities with the 1999 MLWA. The BMGR was authorized for use by the Secretaries of the Air Force and Navy for 25 years until 2024. In 2023, congress once more extended the authorization of the BMGR until October 5, 2049. The 1999 MLWA designates the western portion as BMGR-West (Yuma Segment), consisting of 1,017,990 acres and the eastern portion of the range as BMGR-East (Gila Bend Segment), consisting of a 1,651,235-acre parcel. The 2023 amendment to the 1999 MLWA includes the addition of 2,365.89 acres of land in Maricopa County, Arizona to BMGR-East. The airspace over the Gila Bend Segment belongs to, and is controlled by, the USAF, while the Yuma Segment belongs to and is controlled by the United States Department of the Navy (Navy) (Figure 1 and Figure 2). Ground access to these segments is also controlled by the agency controlling the overlying airspace. Navy control of BMGR-West is administered through MCAS Yuma; USAF control of BMGR-East is administered through Luke Air Force Base (LAFB).

The BMGR is divided into sub-ranges for specific purposes. There are thirteen (13) separate aerial weapons sub-ranges or target complexes and a drone maneuvering area. Four (4) of the ranges are located in the Yuma Segment and are under the operational control of MCAS Yuma. The four (4) ranges include two (2) manned ranges, an air-to-air gunnery range, and an air combat maneuvering range. The remaining nine (9) ranges and target complexes plus the drone maneuvering area are within the Gila Bend Segment and are under the operational control of LAFB.

A.1.2 Munitions Treatment Range

MCAS Yuma's EOD unit is solely responsible for conducting operations at the MTR. EOD personnel are trained emergency response specialists. An explosives or munitions emergency response specialist is defined by 40 Code of Federal Regulations (CFR) 260.10 as an individual trained in chemical or conventional munitions explosives handling, transportation, render-safe procedures, or destruction techniques. Explosives or munitions emergency response specialists include technical escort unit, and DoD-certified civilian or contractor personnel; and other federal, state, or local government, or civilian personnel similarly trained in explosives or munitions emergency responses. All MCAS Yuma EOD personnel referenced in this application meet these requirements as specified in 40 CFR 260.10. Additionally, MCAS Yuma EOD personnel have permit- specific training and an appointment letter from MCAS Yuma.

The processes used by MCAS Yuma EOD personnel at the MTR include open detonation (OD) of explosive ordnance. This activity may involve subsequent recycling of scrap metal and munitions debris documented as safe. Recycling of scrap metal and munitions debris documented as safe is performed by Range Management. In the past, scrap metal collected during range clearing operations was buried on the range. These disposal locations are considered to be solid waste management units (SWMUs) by the ADEQ. Sample data from several of these burial sites including SWMU 11 in the Yuma Segment show that the scrap metal wastes and soil within these burial pits is non-hazardous (Corrective Measure Implementation Report for SWMU11 Dig hole, GCE 2012). Currently, inert scrap metal documented as safe is removed from the BMGR during clearing operations and recycled.

Demilitarization of unserviceable, outdated, or obsolete munitions is an adjunct to proper munitions stockpile management. In addition to treating ordnance stockpiled at MCAS Yuma, the MTR is used to treat ordnance and explosive end items from other military bases and bombing ranges, from local government-owned manufacturing facilities, and from local manufacturers under contract to the United States government located in Arizona and California. No explosives are received from private industry for disposal.

The MTR is located approximately twelve (12) miles southeast of the MCAS Yuma Main Base and two (2) miles south of the Auxiliary Airfield II (Figure A-1 and Figure A-2). The MTR, accessed by an unimproved road approximately one-mile long, consists of a reserved area. The MTR is a square shaped area that is 1000 meters on each side and located approximately three (3) miles inside the western boundary of BMGR. Three- strand barbed wire and razor wire coils surround the perimeter of the MTR. The legal boundaries of the MTR perimeter are shown in Figure A-6. The access road divides the MTR into east and west portions (Figure A-2). Since 1998, no MTR treatment activities have been conducted in the west portion of the MTR due to it reportedly lying in a floodplain. Based on a Federal Emergency Management Agency (FEMA) 2024 flood insurance rate map, the entirety of the MTR lies within the 0.2 percent flood rating and that no elevated flood risk is present on the MTR.

The former open burn (OB) area is located in the northwest corner of the MTR and consists of clean-closed OB trenches formerly used for small caliber munitions. The trenches were clean closed during 1998 in accordance with federal and state regulations (CDM 2001). A former munition wash area (for pink water treatment) was located just south of the former OB area. The munitions wash area operations ceased and the area was disassembled when the OB area was closed in 1998. A RCRA Facility Investigation (RFI) was conducted at the Munitions Wash Area in 2006. The RFI resulted in a No Further Action (NFA) finding by ADEQ on November 4, 2011. A proposed munition wash area (for pink water treatment) in the southwest corner of the MTR was built but never used. This area will remain closed and will not be used for munitions treatment.

The OD area encompasses the east and west portion of the MTR. Currently, there are two (2) main OD areas, the Class A and B detonation area (fragment, non-fragment) and the White Phosphorous detonation area (Figure A-3). Each OD area includes several shot-holes or pits. The shot-holes are created by the detonation of unexploded ordnance. The detonation of a bomb creates a pit and subsequent detonation of bombs increases the pit radius and depth. The detonation pits are inspected weekly, after each detonation, and after storm events or high winds. The pits are inspected for integrity, depth and metal fragments (kickouts). If an inspection indicates a detonation pit is unusable, it is abandoned, not repaired. When the pit becomes too deep (i.e., 10 feet or deeper where it is unsafe to roll a bomb into) the pit is backfilled, and a new detonation pit/shot-hole is developed. Exhibit A-1 includes the MCAS Yuma EOD's Standard Operating Procedures (SOP) for the MTR, which provide further detail on the OD operations.

The MTR is located sufficiently within the boundaries of the BMGR to meet the minimum protective distance standard required by Arizona Administrative Code (AAC) R18-8-264.A, the DoD Explosive Safety Board (DDESB) and 40 CFR 264 Subpart EE Standards (Figure A-3 and Figure A-4). These standards require that OD of waste explosives ranging from 1,000 to 10,000 pounds must be conducted at least 530 meters (1,730 feet) away from the property of others. Additional details concerning the MTR operations are presented in Section 4.

The BMGR is located within the Sonoran Desert section of the Basin and Range physiographic province. The Sonoran Desert consists of 76.4 million acres, including the 2.6-million-acre BMGR range, and extends across all of southwestern Arizona and includes parts of southern California, northwestern Mexico, and Baja California. The Sonoran Desert section of the Basin and Range physiographic province is characterized by north to northwest trending, basins, and isolated mountain ranges separated by desert plains. The plains are wide, nearly level alluvial valleys separated by mountain ranges. The land surface within the basins is relatively flat, with elevations ranging from approximately 200 feet to greater than 1,200 feet above mean sea level. The basins slope gently downward to the north and west toward the Gila and Colorado Rivers. The mountains separating the basins are barren, with peak elevations ranging from 3,000 to greater than 4,000 feet above mean sea level. The highest peak is Maricopa Peak on Javelina Mountain in the Sand Tank Mountains on the eastern boundary of the BMGR.

Within the MTR, the site topography is flat. Surface soils are consistent with desert terrain and

consist of fine to medium-grained sand. Most desert soils are well aerated and high in salt content. Permeability of the coarse-grained soils is relatively high (>0.01 centimeters/second or 0.02 feet per minute), whereas permeability of fine-grained soil is very low (<0.00001 centimeters/second or 0.00002 feet per minute).

Rock types occurring within the BMGR include crystalline igneous and metamorphic basement rock, volcanic and sedimentary bedrock, and volcanic flow rock. Bedrock occurs at various depths throughout the BMGR. In some parts of the range, basement rock occurs at ground surface or extends above surrounding ground level. The mountain ranges are outcrops of the basement rock. Within the basins, basement rock may be as deep as 10,000 feet below ground surface.

The BMGR is tectonically stable; however, faults that offset basin-fill deposits by as much as 60 feet are known to occur within the range. These faults are capable of generating earthquakes due to movement along the fault plane. The Algodones Fault has been mapped to the southwest of the site (Figure A-7).

There are no surface waters in the vicinity of the MTR. The average annual rainfall in the Yuma Basin is 3.18 inches per year. Surface drainage during and immediately following storm events generally flows west, following surface topography. Regionally, surface water drainage is north toward the Gila River, which lies roughly at the northern boundary of the BMGR (paralleling Interstate 8) and westward until it discharges into the Colorado River.

According to the Arizona Water Atlas (Arizona Department of Water Resources, 2009), Tertiary and Quaternary basin fill is the primary aquifer in the Yuma Basin, and specifically beneath the MTR. This aquifer is subdivided into three zones. In descending order, these are the upper fine-grained zone, the coarse-gravel zone, and the wedge zone. The upper zone includes younger alluvium and the uppermost deposits of older alluvium. Little water is pumped from this zone although beneath irrigated areas, the water table lies within it. The middle, coarse gravel zone is the principal water-producing unit. Depths to the coarse gravel zone begin at about 100 feet in the Colorado and Gila River valleys and at about 180 feet below ground surface beneath the Yuma Mesa. Throughout most of the Yuma Basin, the wedge zone underlies the coarse-gravel zone and overlies the Bouse Formation. The wedge zone is a major water-bearing deposit and consists of interbedded sands and gravel and cobbles. Depth to the top of this zone is about 160 feet near Laguna Dam and 300 feet in the southern Yuma Valley (Overby 1992).

Prior to development, nearly all groundwater recharge was from the Colorado and Gila rivers though direct channel infiltration and annual flooding. The general groundwater flow direction was from the Colorado and Gila Rivers southward under the Yuma Mesa. However, a significant source of groundwater recharge now comes from percolation of excess water applied to crops to reduce salt accumulation in the root-zone. A groundwater mound has developed under Yuma Mesa as a result of agricultural irrigation and because groundwater flow away from the area is insufficient to drain rising water levels. This mound and rising groundwater levels in the Yuma area have affected groundwater flow patterns.

As shown on Figure A-7, groundwater beneath the MTR flows to the southeast. Based on site groundwater contours (Figure A-7), it appears that the Algodones Fault is impacting groundwater in the vicinity of the site. Groundwater southwest of the fault is estimated to be approximately 75 feet lower in elevation than the groundwater on the northeast side of the fault. Additionally, the direction of groundwater flow southwest of the fault is in a more southerly direction, while groundwater flows in a southeasterly direction on the northeast side of the fault (Figure A-7).

A.2 Topographic and Physiographic Setting

A.2.1 Surface Waters

The nearest surface water body to the MTR is an irrigation canal located approximately 10 miles northwest of the site, outside the BMGR boundaries.

A.2.2 Meteorological Information

Wind patterns at the BMGR shift in direction throughout the year, as documented in Figure A-8. Since 2021, the University of Arizona Cooperative Extension Arizona Meteorological Network has provided daily wind data for the MTR, indicating that winds predominantly originate from the north at speeds of 6-7 mph. A wind rose is presented in Figure A-8 that shows the wind at MTR is primarily from northerly and southerly directions and secondarily from the west northwest. The wind speed is generally highest from the northerly direction.

A.2.3 Access Control

The majority of the perimeter boundary of the BMGR is posted with signs noting restricted military property. The MTR is located off an improved range road (i.e., gravel/asphalt) south of Auxiliary Airfield II. The MTR is accessed via an unimproved road through the loose desert sand. Off-road equipped vehicles are necessary to access the MTR from either direction. The access road is approximately 1-mile long from the north and 1.5 miles long from the south.

The MTR is surrounded by three-strand barbed wire fence. Multiple warning signs in English and Spanish are posted on all four sides of the MTR. In addition, five-foot coils of razor wire surround the exterior of the MTR to further deter unauthorized access. The only access to the MTR is through the gates on the north and south sides of the MTR that are secured with locks.

Finally, a 50-foot length of eight-foot-tall chain-link fence is located across the south access road approximately 500-yards south of the MTR with warning signs.

Within the MTR there are no additional security devices. Because of the remoteness of the site and the lack of utility services to the MTR there are no alarms or security lighting. Additional information pertaining to site security is provided in Attachment E.

A.2.4 Injection and Withdrawal Wells

There are no injection or withdrawal wells at or near the MTR. A groundwater monitoring well is positioned just outside the MTR boundary at the southeast corner of the facility. Figure A-7 displays the surrounding production wells, with the nearest well, Well ID 562495, located 1.16 miles north of the MTR in an upgradient position.

A.2.5 Structures and Roads

There are two structures located on the MTR. The structures are the emergency safety bunkers consisting of reinforced concrete with a low profile to protect the EOD personnel during a detonation. The concrete shelters are located on the MTR with the shelter entrances opposite of the staged detonations.

The majority of the 2,029 miles of roads for use by vehicles on the BMGR are less than 45 years old, and the roads have generally been established without comprehensive planning. The Lower Gila South Management Plan (Goldwater Amendment) (BLM 1989) presents a six-level road classification scheme for the BMGR. Definitions for these different classes are paraphrased below. The first four road classes are the same as those employed by the American Association of State Highway and Transportation Officials (adopted by the USAF). The latter two classes have been devised for use by the military and have been tentatively accepted as applicable to Cabeza Prieta National Wildlife Refuge by local officials of the United States Fish and Wildlife Service (U of A 1986).

a. PRIMARY. Primary roads include all installation highways serving as main distribution arteries for traffic originating within and outside an installation and that provide access to, throughout, and between various functional areas. Primary roads are paved.

b. SECONDARY. Secondary roads include all installation roads supplementing the primary highway system by providing access to, between, and within the various functional areas. Secondary roads may have a paved or graded soil surface.

c. TERTIARY. Tertiary roads include all installation roads providing access from other roads to individual units or locations within the various functional areas. Tertiary roads have a graded soil surface.

d. PATROL. Patrol roads normally include all installations roads planned and designed for use in surveillance or in patrolling areas for security purposes and may be paved or graded soil.

e. UNIMPROVED. Unimproved roads are dirt roadways that are never maintained, but

that are periodically traveled and easily followed.

f. PRIMITIVE TRACKS. These are dirt roadways that are never maintained and have been rarely traveled in recent years. They are in various stages of re- vegetation and soil recovery.

The classification system is based on the design and the intended primary function of the road.

A.2.6 Fire Control Facilities

Because of the sparse vegetation on the BMGR, the fire potential has been rated extremely low. In addition, the Bureau of Land Management believes that the potential for resource damage from fires is minimal, because of the sparseness of fuel for fires that would limit the ability of fire to migrate over a substantial area (BLM 1989).

There are no fire suppression or control facilities at the MTR with the exception of portable fire extinguishers that are standard equipment on the MCAS Yuma EOD personnel vehicles.

A.2.7 Loading and Unloading Areas

Loading of munitions for treatment is not conducted on the MTR. Loading will occur at MCAS Yuma Ammunition Supply Point (ASP). No specific facility exists for the unloading operations; these activities are conducted on the MTR in the immediate vicinity of the specific treatment unit to be used (e.g., adjacent to the detonation pit).

A.3 Location Information

A.3.1 Flood Plain Standard

Historically, Federal Emergency Management Agency (FEMA) had not performed a flood insurance study for the BMGR, and consequently, a Flood Insurance Rate Map (FIRM) indicating the 100-year flood boundaries near the MTR were never developed or printed by FEMA and was not included in the previous permit. FEMA has now performed a flood insurance study for the BMGR and Figure A-5 displays the most recent FIRM exported from FEMA's National Flood Hazard Layer (NFHL). This map shows that throughout the entire MTR site boundaries, the Annual Chance Flood Hazard is 0.2 percent. This means that the MTR is in the 500-year floodplain and that there's a 1 in 500 chance of the MTR flooding. There are no stormwater control measures at the MTR. There's no evidence of significant surface sediment erosion from stormwater runoff on the site.

A.3.2 Seismic Standard

The estimated location of the Algodones Fault is approximately ¼ mile (1,320 feet) away from the southwest corner of the MTR fence line, which is outside the 200 feet requirement listed in 40 CFR 264.18(a)(1). Therefore, there are no seismic requirements for MTR.

A.4 Traffic Considerations

This section addresses traffic patterns, traffic control, access road surfacing, and load-bearing capacities.

A.4.1 Traffic Patterns

Traffic patterns related to MCAS Yuma MTR operations are elementary and can be followed on Figure A-2. From the MCAS Yuma Main Base, EOD transports travel south on Avenue 3E to County 19th Street. Traffic enters the BMGR on County 19th Street traveling east and proceeds to the Auxiliary Airfield II, where the road turns south. Just south of Auxiliary Airfield II, traffic leaves the secondary road to the unimproved MTR access road. Vehicles proceed south to the MTR (approximately one mile), offload explosive material at the respective treatment area, and withdraw to the designated control point. Ordnance is typically transported using EOD's one-ton pickup trucks; however, on occasion five-ton tactical trucks may be used. Because items are separated by compatibility, the number of transport trucks or trips required depends upon how many incompatible groups of explosives are scheduled for treatment (40 CFR 177.848). The gross weight of the items transported does not exceed the payload capacity of the transport vehicle.

A.4.2 Traffic Control

Traffic control at the MTR is maintained by blocking access (north end) to the operations area and maintaining locked gates on the south end. A red flag is raised at both the north and south ends of the MTR during OD operations until EOD personnel determine that the detonation is completed, and no hazards remain. EOD personnel may require that red flags be raised for longer periods of time or at other times, at their discretion, based on judgment of health and safety concerns.

A.4.3 Access Road Surfacing

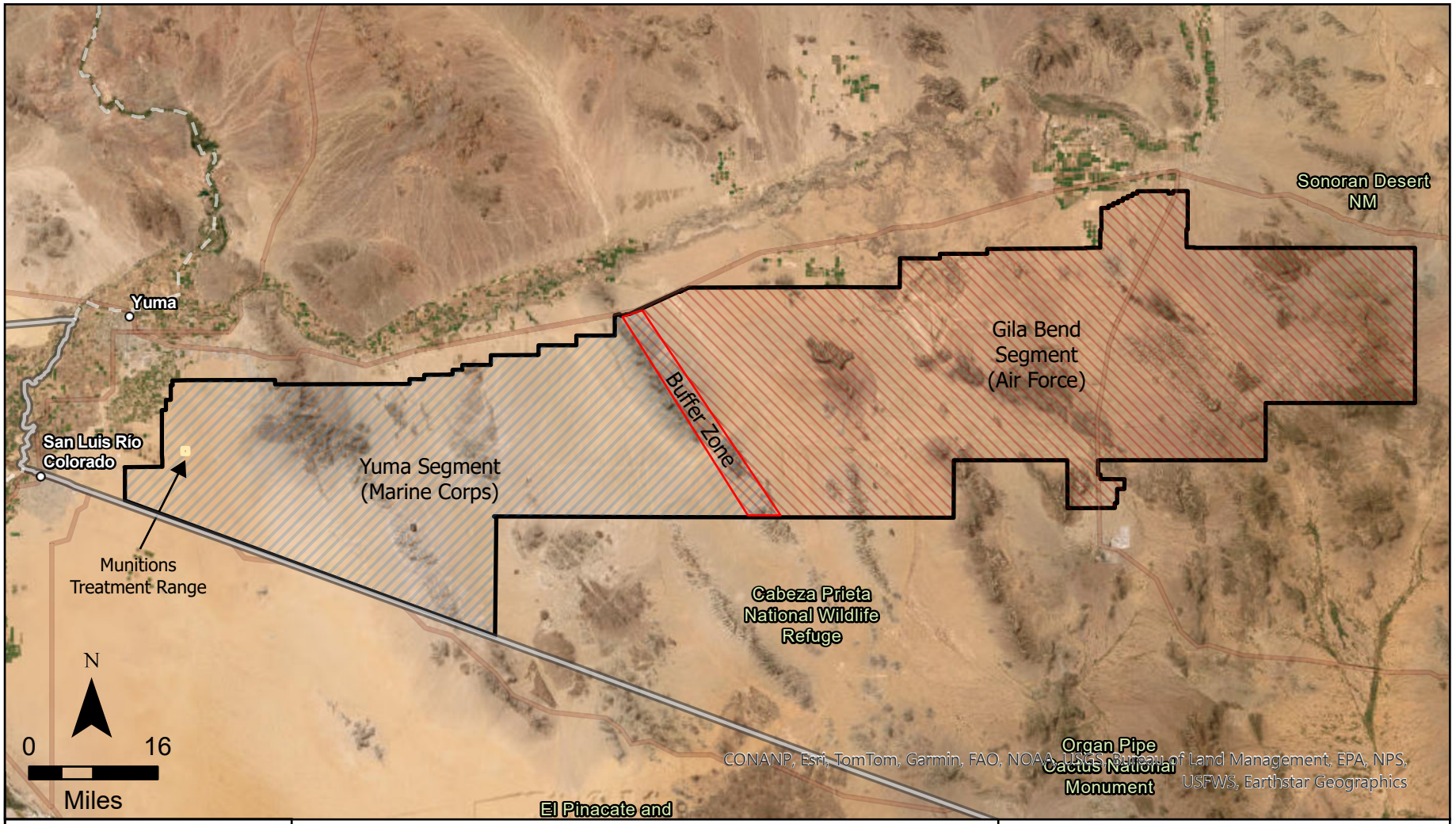
Access to the MTR is by secondary roads from the surrounding agricultural properties on County 19th Street through a posted fence line and then by an unimproved road to the designated area. Elsewhere on the BMGR, MCAS Yuma EOD vehicles also primarily use tertiary roads for travel to various functional areas. For target and range clearing operations, vehicles will routinely operate on lesser categories of road surface, including unimproved roads and primitive tracks.

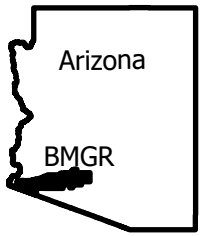
A.4.4 Load-Bearing Capacity

The military vehicles used in the various operations on the BMGR are matched to the terrain to be covered and, consequently, the load-bearing capacity of the various surfaces is sufficient.

Figure A-1

Area Location Map





Munitions Treatment Range

Yuma Segment (Marine Corps)

Gila Bend Segment (Air Force)

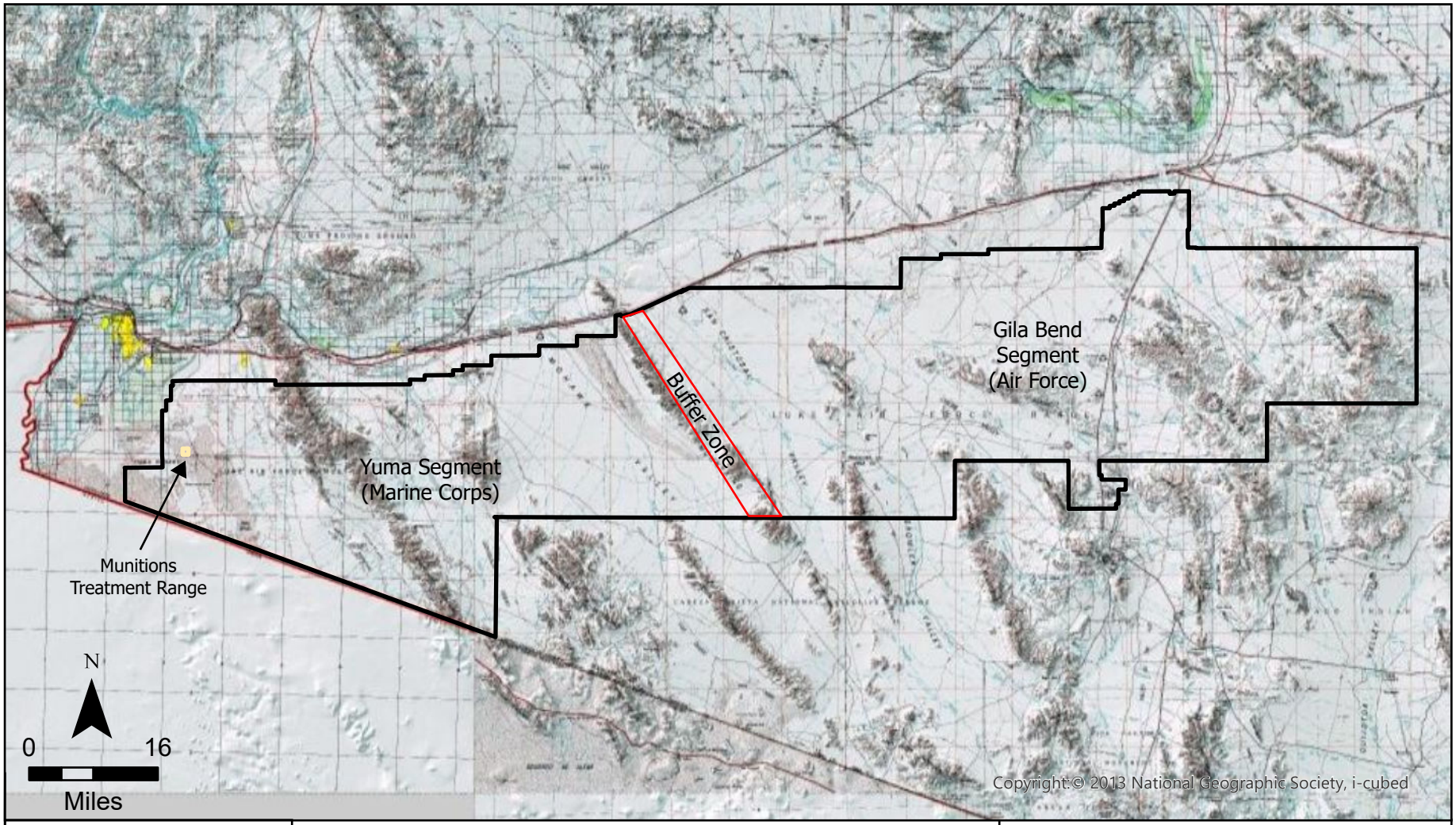
Buffer Zone

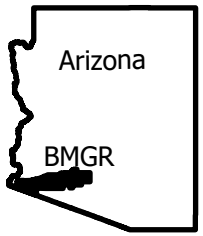
BMGR Boundary

Figure A-1
Area Location Map
Barry M. Goldwater Range

Figure A-2

Range Layout Map





Munitions Treatment Range

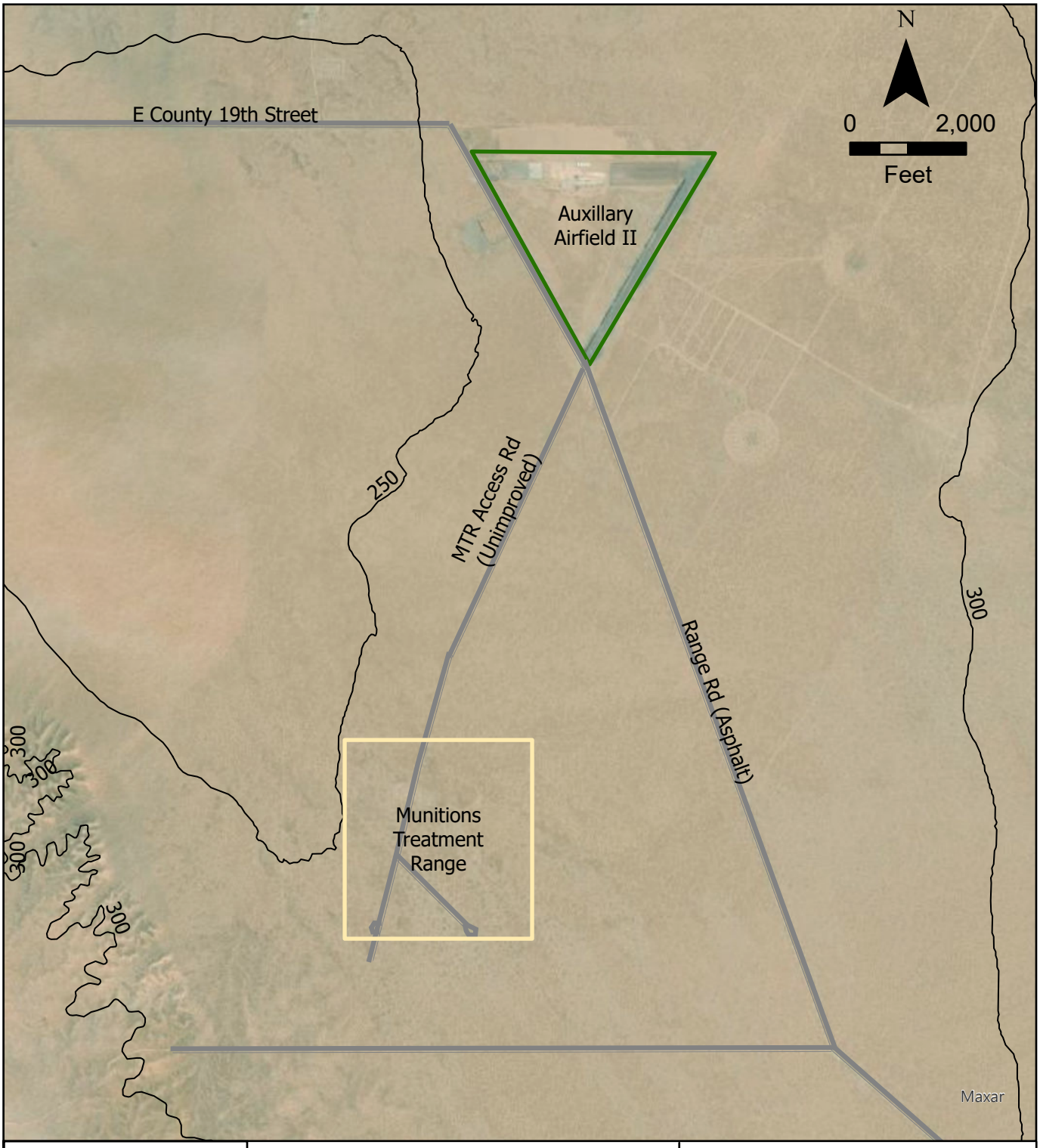
Buffer Zone

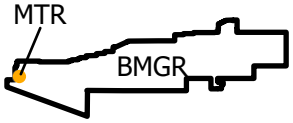
BMGR Boundary

Figure A-2
Range Layout Map
Barry M. Goldwater Range

Figure A-3

MTR Site Location Map



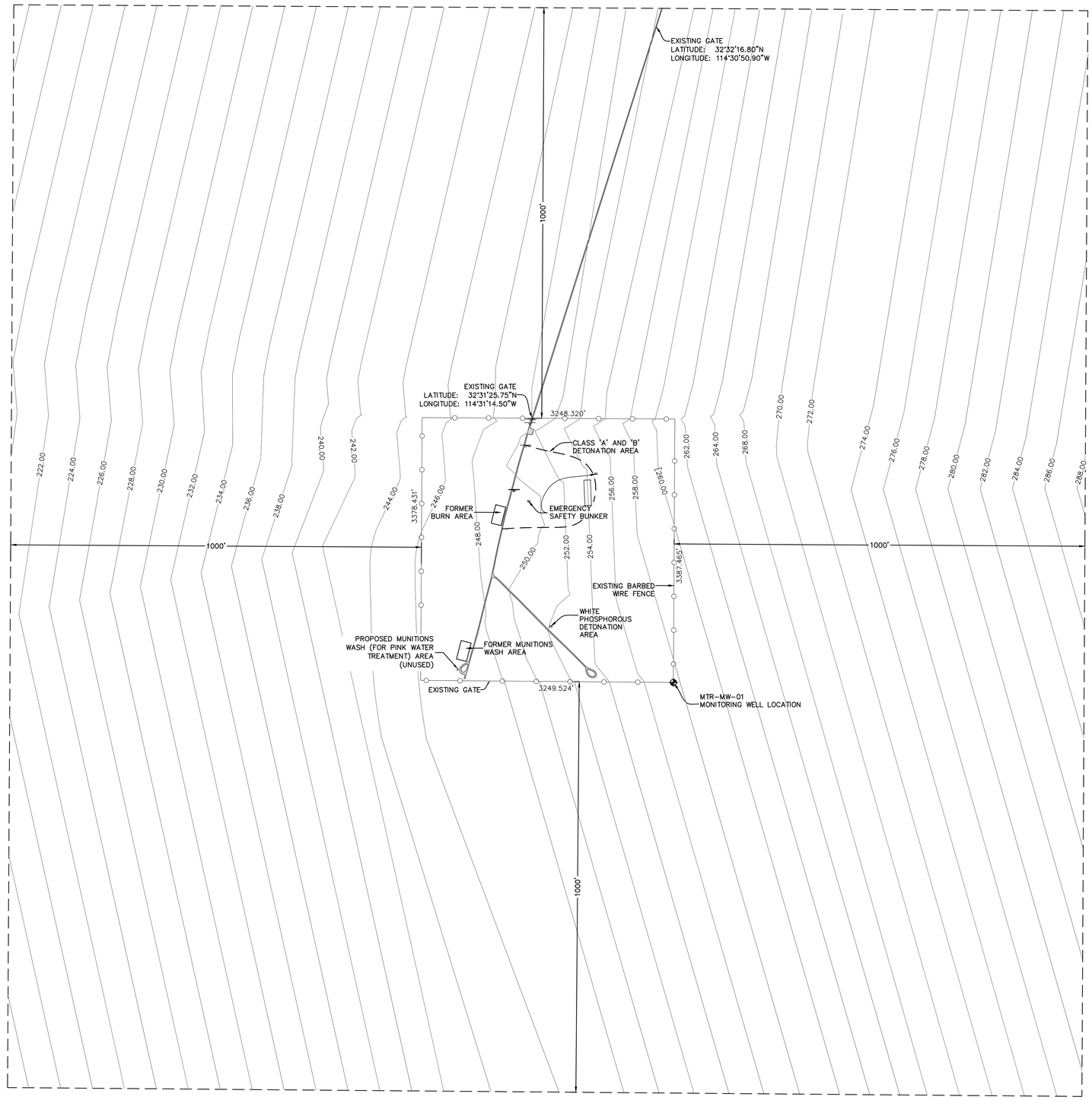


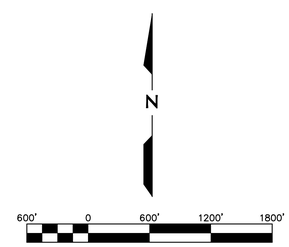
Munitions Treatment Range
Ground Elevation (feet)
Roads
Auxillary Airfield II

Figure A-3
MTR Site Location Map
Barry M. Goldwater Range

Figure A-4

Topographic Map/Site Map





MUNITIONS TREATMENT RANGE BARRY M. GOLDWATER RANGE MCAS YUMA, YUMA, ARIZONA

TOPOGRAPHIC MAP/SITE MAP

FIGURE A-4

SCALE:	AS SHOWN
DATE:	JAN, 2025
DES. BY:	DESIGNER
DRAWN BY:	STAFF
SURVEYED BY:	STAFF
JOB. No.:	20D-5006.X0130
SHEET	– OF –

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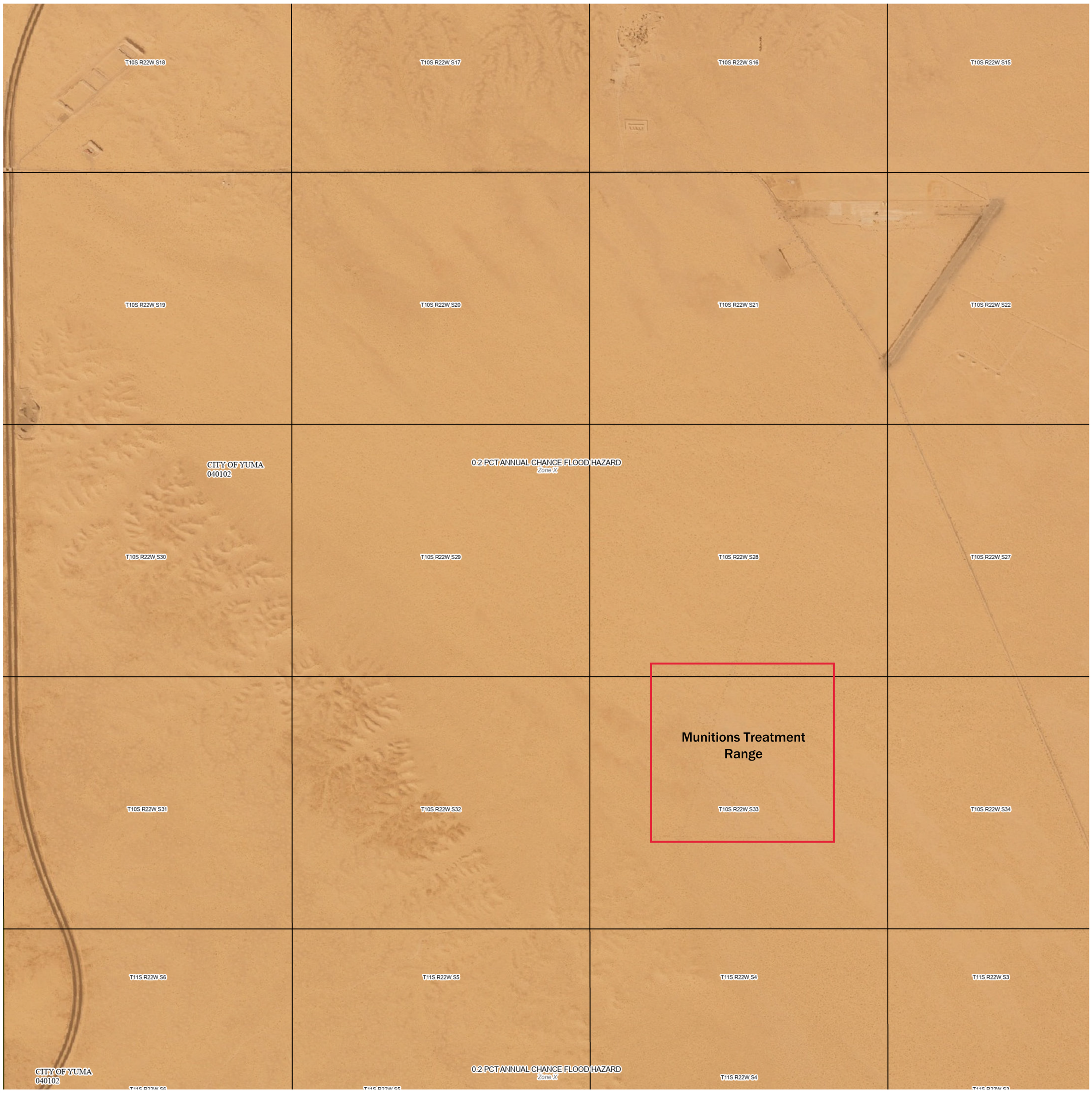
N:\VN-ENV\Liberty JV\2020-1004 NAVFAC NW AE Env Restoration\20D-5006.X0130 Nov Route and MTR\06 Technical\MTR\Permit Renewal\06_2025 Draft MTR Permit App 1st Submittal 2-4-25\Figure Shape Files\Site Plan A-4.dwg

Figure A-5

MTR National Flood Insurance Rate Map

114°33'45.9"W 32°33'58.19"N



114°29'59.19"W 32°29'46.84"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **12/6/2024 6:35 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 3,000 4,000 Feet

0 105 210 420 630 840 Meters

FEMA

National Flood Insurance Program

MAP NUMBER
04027C1870E
EFFECTIVE DATE
August 28, 2008

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

PANEL 1870 OF 2135

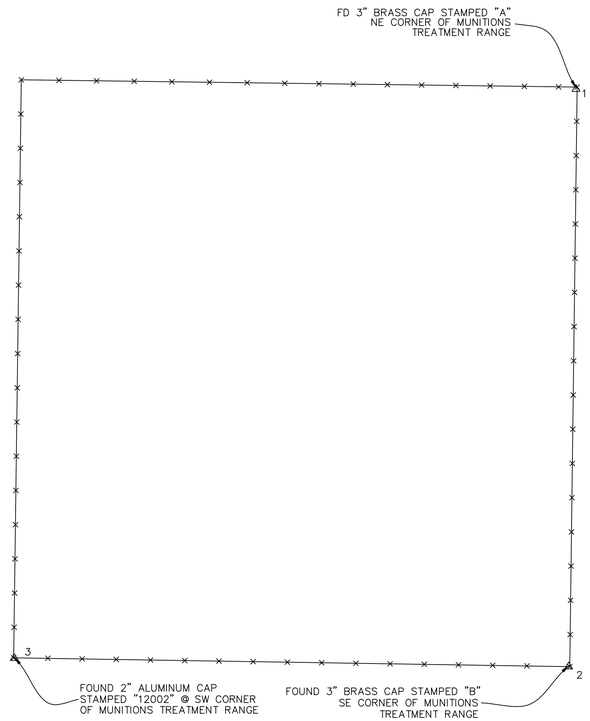
Panel Contains:

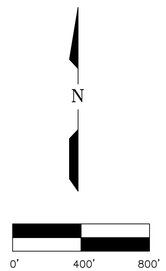
COMMUNITY	NUMBER	PANEL
CITY OF YUMA	040102	1870
YUMA COUNTY UNINCORPORATED AREAS	040099	1870

Figure A-5
Flood Hazard Map
Barry M. Goldwater Range

Figure A-6

Legal Description





MCAS MUNITIONS TREATMENT RANGE SITE
FIGURE A-6

POINT NO.	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	DESCRIPTION
1	555142.58	464281.37	265.84	PT "A"
2	551767.70	464238.70	261.94	PT "B"
3	551816.82	460999.00	252.20	PT "12002"
4	554185.44	462119.25	254.19	SURVEY CONTROL PT "NEI 4"
△ 5	554123.48	461912.54	253.66	SURVEY CONTROL PT "NEI 5"
△ 6	554277.52	462148.07	254.09	SURVEY CONTROL PT "NEI 6"
103	554224.63	461997.28	253.65	SE COR GRID
104	554249.90	461850.93	253.41	SW COR GRID
105	554441.62	461887.59	253.32	NW COR GRID
106	554419.24	462033.83	253.40	NE COR GRID
107	554405.51	461964.79	252.95	B1
108	554356.30	461956.18	253.90	B2
109	554309.23	461946.68	253.19	B3
110	554253.85	461935.06	253.09	B4
111	554366.01	461898.71	253.07	A2
112	554316.34	461890.07	253.33	A3
113	554345.31	462008.37	253.01	C2
114	554299.71	462000.48	253.13	C3
115	554371.73	461936.83	253.30	B12A
116	554345.63	461935.12	253.49	B12B
117	554321.50	461932.26	253.08	B13A
118	554297.13	461926.81	252.65	B13B
119	554365.39	461991.47	253.37	B22A
120	554339.33	461986.96	253.22	B22B
121	554310.31	461981.68	252.83	B23A
122	554292.65	461978.59	252.73	B23B
123	554121.65	461911.76	253.25	4" X 4" WOODEN POST
124	554122.11	461910.88	253.38	3" METAL PIPE
125	554278.23	462149.30	253.88	METAL SIGN
126	554260.07	462216.69	254.40	METAL SIGN
127	554292.43	462454.94	255.60	4" X 4" WOODEN POST

LEGEND

- △ FOUND SURVEY MONUMENT AS NOTED
- ▲ SET ½" REBAR SURVEY MONUMENT
- POST AND SIGN
- o POST OR PIPE AS NOTED
- —×— BARB WIRE FENCE

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MTR RCRA PERMITTING

MCAS GOLDWATER RANGE
YUMA COUNTY, ARIZONA

LEGAL DESCRIPTION

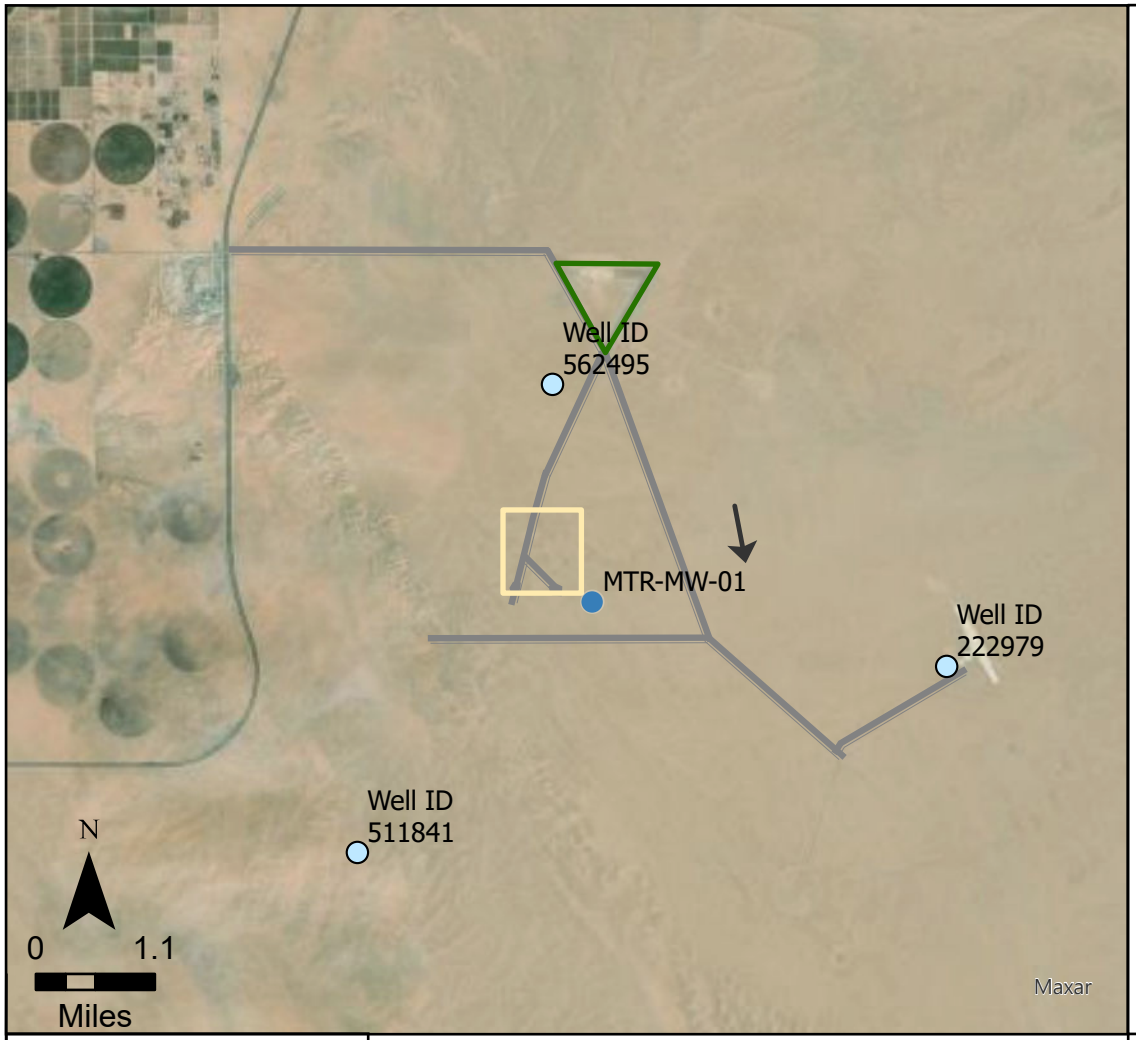
SCALE:	AS SHOWN
DATE:	MAY, 2025
DES. BY:	T.V.E.
DRAWN BY:	A.D.C.
SURVEYED BY:	M.A.C.
JOB. No.:	20D-5006.X0130

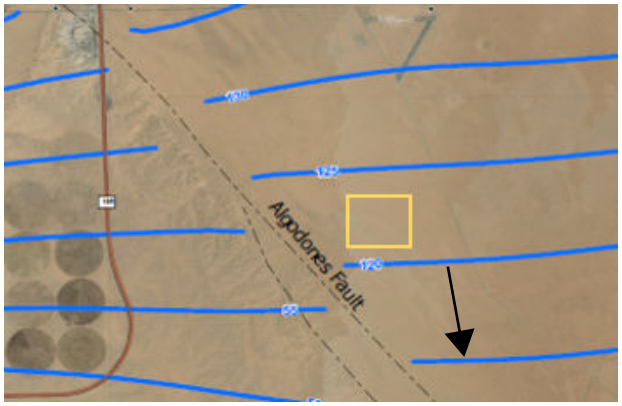
NICKLAUS ENGINEERING, INC.

FIGURE A-6

Figure A-7

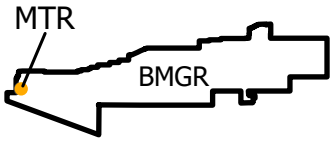
Well Location Map





Source:
Bureau of Reclamation
Yuma Area Groundwater Map June 2022

Distance from MTR Boundary to Production Wells:
Well ID 562495 1.16 mi
Well ID 511841 2.76 mi
Well ID 222979 3.45 mi

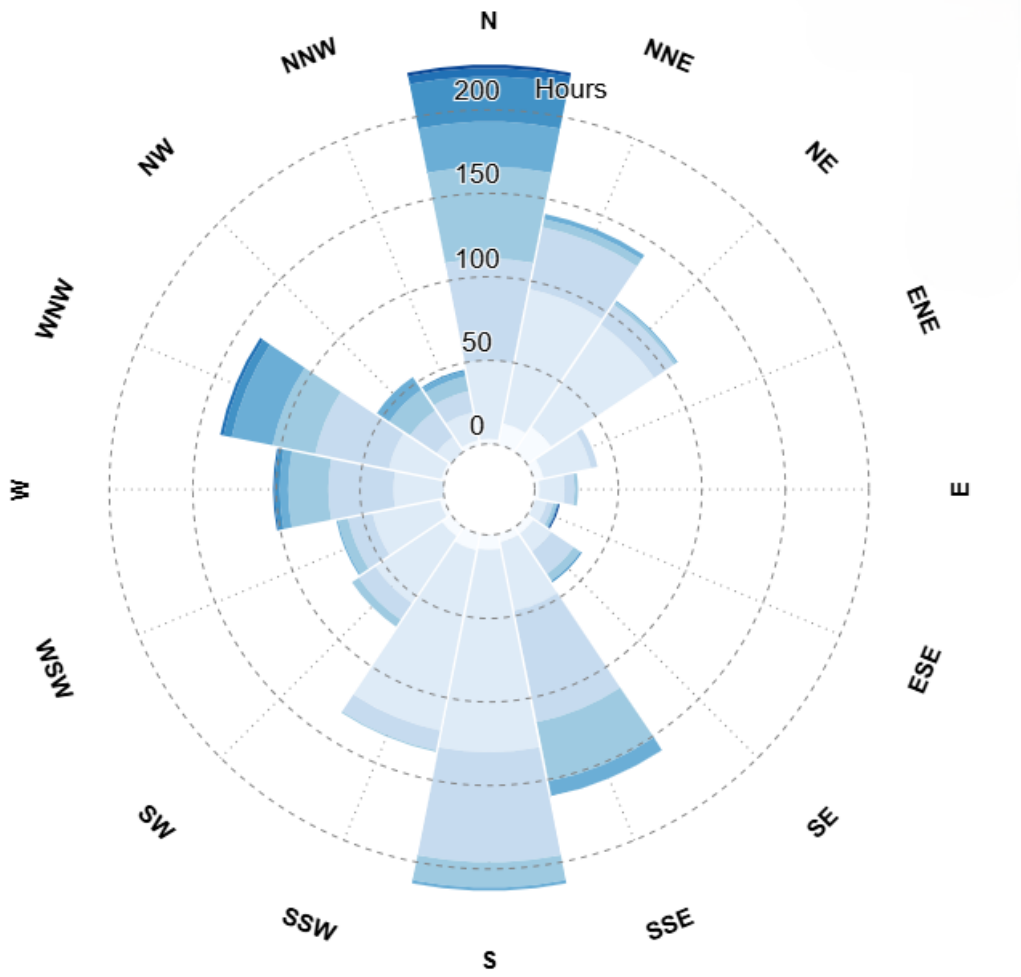


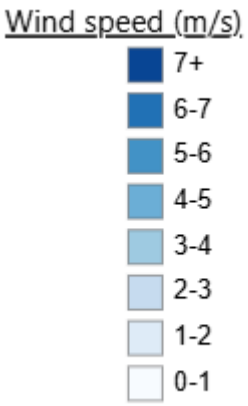
- Groundwater Flow
- Roads
- Auxillary Airfield II
- Munitions Treatment Range
- Existing MTR Well Location
- Groundwater Elevation (feet)
- Production Well

Figure A-7
Well Location Map
Munitions Treatment Range
Barry M. Goldwater Range

Figure A-8

Average Daily Wind Speed and Direction





Data Source: The University of Arizona
Cooperative Extension
Arizona Meteorological Network (AZMet)
AZMet Station: Yuma Valley
Time Step: Daily
Start Date: January 1, 2021
End Date: May 1, 2025

Figure A-8
Average Daily Wind Speed and Direction
Yuma Valley Station
Munitions Treatment Range
Barry M. Goldwater Range

Exhibit A-1

Explosive Ordnance Disposal Standard Operating Procedures

(2025)

MTR STANDARD OPERATING PROCEDURES

EXPLOSIVE ORDNANCE DISPOSAL (EOD)

MUNITIONS TREATMENT RANGE (MTR)

Marine Corps Air Station Yuma

Approved by: _____

Thomas Sheffield (MCAS Yuma Environmental)

Approved By: _____

MSgt Jeramie Pawloski (MCAS Yuma EOD)

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LISTING OF REFERENCES

a. AEODPS 60-series publications

b. NAVSEA OP 3565 (HERO Manual)

c. NAVSEA SW020-AG-SAF-010 (Transportation Safety Handbook)

d. NAVSEA SW020-AF-HBK-010 (Drivers and Inspectors Manual) Glove Box Edition

e. NAVSEAINST 8020.14 Shore Station Explosives Safety Inspections

f. MCO 3571.2H Explosive Ordnance Disposal Program

g. DoDDIR 4715.11 Explosive Safety CONUS (Ranges)

h. DoD Manual 4715.26 DoD Military Munitions Rule (MR) Implementation Procedures

i. MCAS Yuma Range and Training Areas Standard Operating Procedures (StaO 3710.6K)

1.0 Overview

This document has been prepared to present the Standard Operating Procedures (SOPs) to be employed specifically at the Marine Corps Air Station (MCAS) Yuma- Munitions Treatment Range (MTR). All hazardous waste treatment operations completed at the MTR will be conducted in accordance with this SOP, in conjunction with approved Operation Orders, Lesson Plans, and Disassembly and Inerting Procedures for non- emergency explosive operation and training involving live ordnance conducted at the MTR.

The MTR is a hazardous waste treatment facility, as defined by 40 CFR Part 264; and as such, is operated in accordance with an Arizona Hazardous Waste Management Act (AHWMA) Permit. Munitions Treatment through open detonation (OD) is permitted on the MTR. The maximum amount of waste military munitions authorized on the MTR per open detonation is 1,000 pounds (lbs.) net explosive weight (NEW), but may not exceed 5,563 feet (ft) Explosive Safety Quantity Distance (ESQD) Arc for robust munitions (NAVSEA OP-5).

2.0 Prohibited Activities

The following specific operations are PROHIBITED on the MTR:

1. Waste storage is prohibited;
2. Treatment of infectious waste, chemical or biological munitions is prohibited;
3. Treatment of radioactive materials is prohibited;
4. Treatment of any wastes that cannot be detonated is prohibited;
5. Treatment of free liquids is prohibited;
6. Treatment of shipping containers and ordnance packing materials is prohibited;
7. Munition operations > 1,000 lbs. NEW per open detonation and > 5,563 ft ESDQ Arc is prohibited;
8. White Phosphorus operations are prohibited in the Fragmentation Area and the Class A & B Detonation Area and west of the access road;
9. Operations after daylight hours and during electrical/ thunderstorms are prohibited.

FIGURE 1

TOPOGRAPHIC MAP/SITE MAP

EXISTING GATE
LATITUDE: 32°32'16.80"N
LONGITUDE: 114°30'50.90"W

EXISTING GATE
LATITUDE: 32°31'25.75"N
LONGITUDE: 114°31'14.50"W

3248.320'

CLASS 'A' AND 'B' DETONATION AREA

FORMER BURN AREA

EMERGENCY SAFETY BUNKER

EXISTING BARBED WIRE FENCE

WHITE PHOSPHOROUS DETONATION AREA

PROPOSED MUNITIONS WASH (FOR PINK WATER TREATMENT) AREA (UNUSED)

FORMER MUNITIONS WASH AREA

EXISTING GATE

3249.524'

MTR-MW-01
MONITORING WELL LOCATION

1000'

1000'

1000'

1000'

222.00 224.00 226.00 228.00 230.00 232.00 234.00 236.00 238.00 240.00 242.00 244.00 246.00 248.00 250.00 252.00 254.00 256.00 258.00 260.00 262.00 264.00 268.00 270.00 272.00 274.00 276.00 278.00 280.00 282.00 284.00 286.00 288.00

3378.431'

3387.465'

N

600' 0 600' 1200' 1800'

MUNITIONS TREATMENT RANGE BARRY M. GOLDWATER RANGE MCAS YUMA, YUMA, ARIZONA

TOPOGRAPHIC MAP/SITE MAP

FIGURE 1

SCALE:	AS SHOWN
DATE:	JAN, 2025
DES. BY:	DESIGNER
DRAWN BY:	STAFF
SURVEYED BY:	STAFF
JOB. No.:	20D-5006.X0130
SHEET	– OF –

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N:\AN-SDGN\Liberty JV\020-1004 NAVFAC NW AE Env Restoration\20D-5006.X0130 Nov Route and MTR\08 Technical\MTR\Permit Renewal\08_2025 Draft MTR Permit App 1st Submittal 2-4-25\Figure Shape Files\Site Plan A-4.dwg

3.0 Required Qualifications for Conducting Operations on the MTR

Only personnel who are qualified and authorized in accordance with Reference f (*MCO 3571.2H Explosive Ordnance Disposal Program)*, may conduct treatment operations at the MTR. These qualified EOD personnel must meet the requirements listed in 40 CFR 260.10 for explosives/munitions emergency response: an individual trained in conventional munitions or explosives handling, transportation, render-safe procedures, or destruction techniques. This requirement is met through basic Naval School Explosive Ordnance Disposal (NAVSCOLEOD) training. Personnel conducting treatment operations on the MTR must have a letter of appointment from MCAS Yuma.

Additionally, personnel operating on the MTR must comply with the requirements of 29CFR 1910.120(e) and 40CFR 264.16 which require:

1. 40-hour course on Hazardous Waste Management
2. Annual 8-hour refresher courses on Hazardous Waste Management

Active-duty DoD EOD personnel, receive occupational safety training equivalent to the hazardous materials requirements of Section 1910.120 of Title 29, CFR through basic NAVSCOLEOD training as stated in reference h (*DoD Manual 4715.26 DoD Military Munitions Rule (MR) Implementation Procedures)*.Per reference h, the Hazardous Waste Operations and Emergency Response (HAZWOPER) hazardous material specialist training equivalency for active-duty personnel is obtained and maintained through successful completion of basic EOD training sponsored by the Naval EOD School and proficiency training at their unit of assignment, respectively.

4.0 Security/Inspections

Security of the MTR is provided using the following measures:

1. Limited Access- The MTR operating area is accessed through one of two gates. Gates are closed and locked when the range is not in use.

2. Mandatory Weekly Inspections- MCAS Environmental must inspect the MTR weekly to:

a) Identify evidence of unauthorized entry within MTR boundaries
b) Check condition of warning signs, boundary fences, and gates
c) Maintain overall readiness of the MTR
d) Check condition of access and periphery roads

All inspections must be maintained in the MCAS Environmental Operations and Inspections Log. ADEQ can inspect the MTR facility and MTR permit records during normal business hours.

5.0 Operations

5.1 General

Each explosive operation is unique. Therefore, a detailed Operation Order, Lesson Plans, or Disassembly and Inerting Procedure is required, in addition to this SOP, for non-emergency EOD operations and training involving live ordnance. The Operation Order, Lesson Plans, or Disassembly and Inerting Procedure will cover operation specific policies and procedures that cannot be delineated in this manual.

Review and approval of Operation Orders, Lesson Plans, and Disassembly and Inerting Procedures is delegated to the Officer in Charge (OIC) of the MCAS Yuma EOD. This SOP, together with approved Operation Orders, Lesson Plans, or Disassembly and Inerting Procedures will serve as an SOP for non-emergency explosive operation and training involving live ordnance conducted at the MTR.

5.2 Hours of Operation

Routine demolition and training operations will be conducted only during normal work hours, sunrise to sunset, Monday through Friday.

5.3 Personnel Roles and Responsibilities

For every non-emergency operation (including training), at least three qualified personnel must be present: an OIC (who may also assume OpsO responsibilities), an RSO, and qualified medical personnel

5.3.1 Officer in Charge (OIC)

The OIC is responsible for the organization and safe conduct of all operations. The OIC will be EOD-qualified. Operation Orders, Lesson Plans, or Disassembly and Inerting Procedures for the operation will designate the OIC.

5.3.2 Operations Officer (OpsO)

The OpsO is responsible for assisting the OIC with the organization and safe conduct of all operations. Operation Orders, Lesson Plans, or Disassembly and lnerting Procedures for the operation will designate the OpsO.

5.3.3 Range Safety Officer (RSO)

The RSO will be EOD-qualified. Operation Orders, Lesson Plans, or Disassembly and Inerting Procedures for the operation will designate the RSO.

5.3.4 Qualified Medical Personnel

Qualified medical personnel will be present anytime munitions treatment or other

explosive operations are being conducted at the MTR in accordance with Reference i (*MCAS Yuma Range and Training Areas Standard Operating Procedures (StaO 3710.6K)*). Per Reference i, qualified medical personal can be an Emergency Medical Technician II (EMT-II), all Corpsmen or Medics, Paramedics, Special Ops, or Interdisciplinary Teams (IDTs). If the qualified medical personnel leave the site, the operation must cease.

5.4 Scheduling/Range Utilization Requests

5.4.1 By Military Organizations

a. Requests for use by military personnel other than EOD will be routed through the MCAS Yuma EOD Officer.
b. Each unit using the MTR must provide their own range safety officer.
c. Each unit must provide their own corpsman, safety vehicle, and Class V (W) materials.
d. A qualified representative from MCAS Yuma EOD will be present during all operations on the MTR.

5.4.2 By Non-Military Organizations.

a. Requests will be forwarded, through MCAS Environmental and MCAS EOD to the Commanding Officer, MCAS Yuma (OpsO).

5.5 General Safety Precautions

Review all general safety precautions applicable to the conduct of explosive operations on the MTR as listed in the following references:

b. NAVSEA OP 3565 (HERO Manual)

c. NAVSEA SW020-AG-SAF-010 (Transportation Safety Handbook)

d. NAVSEA SW020-AF-HBK-010 (Drivers and Inspectors Manual) Glove Box Edition

e. NAVSEAINST 8020.14 Shore Station Explosives Safety Inspections

f. MCO 3571.2H Explosive Ordnance Disposal Program

g. DoDDIR 4715.11 Explosive Safety CONUS (Ranges)

h. DoD Manual 4715.26 DoD Military Munitions Rule (MR) Implementation Procedures

i. MCAS Yuma Range and Training Areas Standard Operating Procedures (StaO 3710.6K)

Specific safety precautions for each operation will be annotated in the Operation Order,

Lesson Plans, or Disassembly and Inerting Procedure pertaining to the specific operation.

In the case of an accident, incident, or emergency mishap, the RSO is responsible for ensuring that all operations cease immediately, the OIC is responsible for mustering the onsite personnel and conducting a head count, and the qualified medical personnel is responsible for initiating a medical evacuation (MEDEVAC), as necessary.

5.5.1 Safety Equipment

a. The following safety equipment is required for all operations on the MTR:
   i. Safety Vehicle equipped with:
      a) Radio
      b) Emergency lights
      c) Cellular/Satellite phone
      d) Siren
      e) Shovels
      f) Fire extinguishers
   ii. Medical kit
   iii. Hand-held radios
   iv. Portable Eyewash
   v. 5-gallon container of water

Safety equipment, beyond what is listed above, required for each operation will be based on the operation being conducted. Required safety equipment will be listed in the Operation Order, Lesson Plan, or Disassembly and Inerting Procedure pertaining to the specific operation.

5.6 Communication

All range operations require two forms of communication. A minimum of one handheld radio (maintained by the RSO) and one cell phone or satellite phone will be tested as operational before each range operation. Emergency numbers will be stored on the cellular/satellite phone. All personnel will be familiar with radio and phone.

To establish two-way communication for every operation, EOD personnel must contact Range Scheduling or Air Traffic Control (via cellular/satellite phone or radio) to notify them of the start of operations prior to arriving at the MTR. Operations will not begin until two- way communication is established. If during an operation, two-communication is lost, all operations will cease until positive communications are re-established.

5.7 Security/Warning Signals

Prior to the immediate initiation of an open pit detonation, the following actions will be

taken:

(1) The red "Baker" flags are raised at the entrance gates to the MTR. The RSO will conduct a communications check with all personnel on the range. A visual check of the perimeter will be done to establish that no unauthorized personnel are present on the range.

(2) The range access road will be blocked to ensure no one enters the range during the detonation.

(3) The siren on the EOD vehicle will be sounded for one minute prior to the first detonation only.

(4) A "fire in the hole" will be sounded 3 times prior to every detonation.

(5) For misfires, EOD will follow the current AEODPS 60 Series (*Reference a)* guidance for wait times that apply to Time Fuse and non-electric blasting cap, shock tubes, and electric blasting cap.

5.8 Receipt of Hazardous Waste

5.8.1 Manifested Hazardous Waste

Manifested hazardous waste received at the MTR for treatment will be handled following 40 CFR 264.71. The list of Munitions Inventory and Paperwork tasks is provided to assist the OpsO while performing these tasks. The OpsO will work in conjunction with MCAS Yuma Environmental to complete and process EPA Form 8700-22A, Uniform Hazardous Waste Manifest.

5.8.2 Land Disposal Restrictions

For treatment operations, the generator must provide a Land Disposal Restriction (LDR) Notification to the MCAS EOD. This is a one-time requirement for each generator and each waste stream, i.e., if the generator has previously sent a specific waste to the MTR for treatment, then the LDR notification requirement has already been met. For new generators and for new waste streams (i.e., new waste characteristics), the LDR notification must accompany the Uniform Hazardous Waste Manifest.

5.9 Storage

There will be no storage or hazardous waste on the MTR.

5.10 Treatment Procedures

Specific procedures used for munitions treatment depend on the amount and type of munitions to be treated and explosives to be used. The Operation Order, Lesson Plan, or Disassembly and Inerting Procedure, per references (a) through (f), and other EOD publications, and technical manuals will be used to plan the appropriate treatment strategy.

5.11 Backfilling

No backfilling of shot holes shall occur without notification to MCAS Environmental. Soil within the hole must be sampled prior to backfill in accordance with the requirements of the MTR RCRA Permit.

MCAS Environmental schedules and oversees sampling event. An EOD escort is required for all sampling events. MCAS Environmental will coordinate for EOD escort.

6.0 Recordkeeping

6.1 Operating Records

Written operating records of all operations conducted at the MTR will be maintained in the Operations and Inspection Log. The following information must be recorded and maintained in the operating record until the facility is closed:

1. The quantity of hazardous waste received, the specific manifest document numbers (if the waste was accompanied by a manifest), the date of its treatment, and the amount/type of explosives used will be recorded on the Explosive Ordnance Disposal Information Management System (EODIMS) report.
2. The hazardous waste treatment location (i.e., the MTR).
3. Records and results of waste analyses and trial tests as available.
4. Summary reports and details of all incidents that require implementing emergency procedures as specified in 40 CFR 264.56 (i).
5. Records and results of inspections as required by 40 CFR 264.15(d).
6. Monitoring, testing, or analytical data, and corrective action when required (maintained by MCAS Environmental).
7. In the event of accident/incident, all investigation reports will be maintained in the operating log.

6.2 Training Records

In compliance with 40 CFR 264.16(e) reference g.- (*DoDDIR 4715.11 Explosive Safety CONUS (Ranges)*), personnel training records will be maintained for a period of at least

three years after personnel have been transferred or separated from this command. The following information will be contained in the training records:

1. Letters of appointment with job description and responsibilities.
2. Copy of 8-hour annual refresher course certification. Copy of graduation certificate from the Naval Explosive Ordnance Disposal School and refreshers. The 40-hour course on Hazardous Waste Management is completed in conjunction with the Naval Explosive Ordnance Disposal School.

ATTACHMENT B
WASTE ANALYSIS PLAN

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B.1 Chemical and Physical Analyses B-1

B.2 Residues B-3

B.3 Waste Analysis Plan B-3

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Exhibit B-1 Waste Analysis Data
Exhibit B-2 Basic Explosive Compositions
Exhibit B-3 Non-Explosive Compositions
Exhibit B-4 Explosive Ordnance Disposal Information Management System (EODIMS) report
Exhibit B-5 Ordnance Potentially Treated at the MCAS Yuma Munitions Treatment Range
Exhibit B-6 NAVSEA OP-5 (Eighth Revision)
Exhibit B-7 Navy's Shipping Inspector's Manual for Ammunition, Explosives and Related Hazardous Material

ATTACHMENT B
Waste Characterization and Waste Analysis Plan

Inventories of military ordnance items are maintained at various military installations. Because ordnance items held in military readiness stockpiles are subject to deterioration and obsolescence, action is required to safely remove and treat these items. Other explosive wastes may be generated from training operations on the BMGR or at manufacturing facilities under contract to the United States Government. The terms of the contract may provide for the disposal of explosive items that do not meet performance specifications, are obsolete, or simply excess product. These unusable munitions contain the same explosives as functional munitions and must be treated and disposed of accordingly. If these various items cannot be reworked, then they must be demilitarized, which means to render the items no longer functional for their intended military use and to free them of hazard (e.g., explosives, reactives) to the point that salvageable parts may be sold to the public or recycled.

Items from stockpiles, range clearing operations, or local government-owned manufacturing facilities are brought to MCAS Yuma's MTR for scheduled operations. Storage of waste explosives on the BMGR is not allowed prior to a scheduled operation. Items from other military installations may be held for less than ten (10) days at MCAS Yuma's ammunition supply point (ASP) prior to transport to and treatment at the MTR. While explosive ordnance items are awaiting a specific treatment process, they do not represent an environmental concern since they are intact end-use items.

The chemical and physical natures of the typical reactive wastes treated at the MCAS Yuma MTR are described in Section B.1. A Waste Analysis Plan for sampling, testing, and evaluating the reactive wastes resulting from the treatment operations is included in Section B.3.

B.1 Chemical and Physical Analyses

A list of the types of ordnance typically demilitarized or treated at the MTR, including the explosive contents of the respective ordnance is presented in Exhibit B-1. Obsolete and off- specification items are assumed to have the same characteristics as currently acceptable items. Explosive content by weight and type may vary by model. Exhibit B-2 lists the chemical constituents of the basic explosive compositions used in the various end items to be demilitarized. Categorically, the types of explosive constituents within the various end-use items are similar; however, the specific quantities of the constituents may vary considerably. Exhibit B-3 lists the chemical constituents of the non-explosive compositions of the end-use items to be disposed. No chemical agents or chemical or nuclear munitions are treated at the MTR.

Prior to treatment, MCAS Yuma verifies that the quantity and type of munitions received is consistent with that shown on the generator's manifest. The primary method of munitions identification is the Department of Defense Identification Code (DODIC). The DODIC is an indication that the munition is a Department of Defense ordnance item and part of the United States inventory. Because the

makeup of the munitions to be treated is standard and thus does not change, the waste constituents are known upon identification and verification of the munitions.

Occasionally items are received or recovered where the ordnance is improvised, modified, or the DODIC is not evident, the MCAS Yuma EOD personnel visually inspect the munition to identify the ordnance item and its composition. Under mutual aid agreements, the MTR may also treat improvised explosive devices (IEDs) recovered by civil authorities (e.g., city police, county sheriff, state highway patrol, fire department, and Federal Bureau of Investigation (FBI)). As provided by international agreements and as authorized by service level Designated Disposition Authority (DDA), the MTR may be utilized to treat foreign munitions. The specific composition of IEDs and foreign munitions may not be known, but enough can be determined by the explosives specialists to identify the appropriate method of treatment. For every Open Detonation (OD) event, the quantity of hazardous waste received, the specific manifest document numbers (if the waste was accompanied by a manifest), the date of its treatment, and the amount / type of explosives used is recorded on the Explosive Ordnance Disposal Information Management System report (Exhibit B-4) which is then maintained in the MCAS Yuma EOD operating record.

As part of the treatment process, MCAS Yuma EOD personnel make a determination as to whether hazardous waste remains reactive after detonation and needs to be further treated, or if non-reactive scrap metal remains that can be recycled as non-hazardous solid waste. This determination is based on the characteristic of reactivity, as defined in 40 CFR 261.23(a). All hazardous waste codes carried by any given munition will be considered in determining if that munition remains a hazardous waste after being treated by open detonation.

Exhibit B-1 represents approximately 90% of the ordnance ever treated at the MTR. The remaining 10% of ordnance items that could be treated at the MTR is listed in Exhibit B-5. This appendix identifies all of the explosive items that could be received from other military installations including Allied Nation ordnance that have been used on the BMGR and are acceptable for treatment at the MTR. The chemical compositions for all of the explosive items in this listing are not included, but they are available from the munitions supply at MCAS Yuma Station Weapons. Items received from other military installations must meet the following criteria:

- The item must have a national stock number.
- The item must be an end-use item.
- The item must be a conventional weapon (i.e., not chemical or nuclear).
- The item must not contain free liquid.
- The item must be a Class 1, Division 1.1, 1.2 or 1.3 explosive.

Receipt of explosive ordnance from local government-owned manufacturing facilities by MCAS Yuma for disposal at the MTR occurs infrequently, on the order of once or twice each year. These items are received through the Defense Contracts and Support Management Agency (DCASMA) and are typically received in very small quantities (i.e., less than 500 pounds net explosive weight [NEW]. Note: Net explosive weight is approximately one-third of the total weight, though it varies by specific munition).

The annual amount of munitions destroyed at the MTR varies widely from year to year. From 1989 to 1999, the total weight of destroyed munitions ranged from 1,000 pounds NEW to approximately 60,000 pounds NEW. The maximum volume of explosive waste military munitions authorized per OD at the MTR is 1,000 pounds NEW, but may not exceed the 5,563 ft Explosive Safety Quantity Distance Arc for robust munitions per Exhibit B-6. The OD NEW information for the MTR is unavailable for the years between 2000 and 2003 (gap in operating record). From 2004 to 2014, the total weight of munitions destroyed ranged from 2 pounds NEW to 6,500 pounds NEW. Many limiting factors determine the number of ODs that can occur per day at the MTR:

- Events are only conducted during the daylight hours;
- The number of events per day are limited by the set up time required for each event;
- Weather conditions, including wind direction and cloud cover, which greatly affect the noise factor;
- The occurrence of thunder and lightning can prevent or delay an event; and
- The flight patterns and schedules of area aircraft limit the possibilities of performing events.

Considering all the above-mentioned limiting factors, events are scheduled in advance with MCAS Yuma EOD. One week's notice is provided if possible.

B.2 Residues

The OD process at the MCAS Yuma MTR primarily involves munitions containing high explosives. The high explosives are primarily mixtures of cyclotrimethylenetrinitramine (RDX, or cyclonite) and cyclotetramethylenetetranitramine (HMX), which result in the evolution of 0.16 pounds of Nitrogen Oxides (NO_x) per pound charge, 0.02 pounds of Carbon monoxide (CO) per pound charge and 0.81 pounds of nitrogen (N_2), Carbon Dioxide (CO_2), and water (H_2O) per pound charge during treatment operations. The solid residues from treatment operations consist primarily of inert metal casing and fragments. Although OD is a very effective treatment process, minimal quantities of energetic materials or detonation by-products may remain from incomplete combustion or kickouts.

B.3 Waste Analysis Plan

The objectives of the Waste Analysis Plan are: (1) to provide a waste characterization rationale that will ensure successful thermal treatment of the wastes and (2) to provide adequate documentation for disposal of the treatment residues.

Pretreatment waste analyses are not required to assure successful demilitarization. Pretreatment is not needed because only end-use items are stored and treated and there are no free liquids or sludge process waste received for treatment at the MTR. The composition of the ordnance and propellants, explosives, and pyrotechnics (PEP) are well known, and the destruction methods for these items are specified in various technical documents common to the DoD.

In addition, MCAS Yuma EOD personnel inspect and inventory all waste devices received, as well as verify the stated descriptions of the end-use items and explosive or pyrotechnic content. Further, a log of all munitions treated (amount and type) is maintained by MCAS Yuma EOD personnel in

accordance with the EOD SOP (Attachment A, Exhibit A-1). End-use items received from offsite activities are manifested to MCAS Yuma and include all information specified in DoD's standard turn-in requirements. This information enables proper handling and storage of explosive ordnance elsewhere, if necessary, before delivery to the MTR for demilitarization. The procedures and facilities used for demilitarization of items received from offsite facilities are exactly the same as those used for items generated by normal mission activity on the BMGR. The EOD SOP (Attachment A, Exhibit A-1) and the most current version of Naval Sea Systems Command (NAVSEA) Operations Procedure 5 (OP-5) (Exhibit B-6) are the primary guidance documents that govern the destruction of these items. All transportation and shipment of explosive ordnance follow the Navy's Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials (Exhibit B-7) guidance documents that govern the destruction of these items. All transportation and shipment of explosive ordnance follow the Navy's Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials (Exhibit B-7).

The second component of the Waste Analysis Plan concerns the explosive residue or kickout generated from OD operations. Each ammunition and explosive operation is unique. The amount of kickout resulting from a detonation event is dependent on the size (amount of NEW) of ordnance that has been treated. Metal fragments are dispersed in and around the pit at varying distances inside the 1,000-meter square fenced area of the MTR. After each event, the detonation area is inspected by MCAS Yuma EOD personnel for kickout. All kickout is collected and identified as either explosive residue or metal fragments. Explosive residue is disposed of by further detonation and non-explosive metal fragments are recycled as inert scrap metal. No post-treatment analysis is performed on scrap metal. Weekly inspections are conducted to verify the integrity of the fence around the MTR and verify that kickout is not present beyond the fence. If, during a post-event or weekly inspection, kickout is found outside the fenced area, it is collected, evaluated, and treated appropriately.

Exhibit B-1
Waste Analysis Data

End Item	Constituents	General or Typical Concentration or Amount
MK-4 Spotting Charge	Black Powder Primer	3 grams <1 gram
CXU-1 Spotting Charge	Primer Propellant Titanium Tetrachloride	<1 gram 1 gram 1.5 oz
CXU-2 Spotting Charge	Primer Propellant Titanium Tetrachloride	<1 gram 1 gram 43 ml
CXU-3 Spotting Charge	Primer Black Powder Titanium Tetrachloride	<1 gram 3 grams 0.6 oz
CXU-4 Spotting Charge	Titanium Tetrachloride	1.9 oz
Mk 81 thru Mk 84 Bomb	Tritonal Explosive Minol Explosive H6 Explosive	High explosive filler Varies from 100-945 lbs. depending on Mk-series bomb. Any of these fillers is possible
Fuses, Bomb M 904 M 905 Mk 346 Mk 376 FMU – 54 FMU - 7	 Lead Azide and Tetryl Lead Azide and Tetryl Lead Azide and Tetryl Lead Azide and Tetryl M26 Percussion Primer M31A1 Detonator	 <1 gram <1 gram <1 gram <1 gram <1 gram <1 gram
Fuses, Rocket M427 M423	Tetryl Lead Azide and Tetryl Lead Azide and Tetryl	<6 grams <1 gram <1 gram
20 mm Projectile, High Explosive Incendiary	RDX Ammonium Perchlorate Aluminum Powder Calcium Stearate	2 grams 4 grams 6 grams <1 gram
30 mm Projectile, High Explosive Incendiary	RDX / Aluminum HMX	58 grams <1 gram
40 mm Projectile, Practice	Cartridge: Yellow Smoke Propelling Charge Fuse Detonator Fuse Lead: Tetryl or RDX Fuse Booster: RDX	4 grams <1 gram <1 gram <1 gram 2 grams

Exhibit B-1
Waste Analysis Data (continued)

End Item	Constituents	General or Typical Concentration or Amount
40 mm Projectile, High Explosive	Cartridge Main Charge: (Composition A5-RDX and Desensitizer)	57 grams (2 oz), M384 and M383; 45 grams (1.6 oz) M677
	Lead Charge: RDX	<1 gram
	Detonator Charge: RDX	<1 gram
	Propelling Charge: M2 Propellant	5 grams
BGM – 71 (TOW) Missile	TOW	
	Main Charge – Octol	2.4 kilograms (5.3 lbs)
	Booster – PBX	27 grams
	Safe and Arm Device	<1 gram
	Detonator – Lead Azide / PETN	
	Safe and Arm Device	<1 gram
	Lead (2) – Mono-nitroresorcinate	
	ITOW	
	Main Charge – HMX	2 kilograms (4.5 lbs)
	Booster – PBXN - 5	10 grams
	PIC – PBXN - 5 - 5	<1 gram
	Safe and Arm Device	<1 gram
	Detonator – Lead Azide / PETN	
	Safe and Arm Device	<1 gram
	Lead (2) – Mono-nitroresorcinate	
BGM – 71 (TOW) Missile (continued)	TOW – 2	
	Main Charge – HMX	3.1 kilograms (6.8 lbs)
	Booster – PBXN – 5	18.6 grams
	PIC – PBXN – 5	<1 gram
	Safe and Arm Device	<1 gram
	Detonator – Lead Azide / PETN	
	Safe and Arm Device	<1 gram
	Leads (2) - Mono-nitroresorcinate	
	Flight Rocket Motor for TOW / ITOW / Practice Missiles – Double Base Propellant	2.7 kilograms (5.9 lbs)
	Flight Rocket Motor for TOW – 2 Double Base Propellant	3.2 kilograms (7.2 lbs)
	Igniter – Pyrogen / Solid Propellant	16 grams
	Thermal Battery Squib – Pyrotechnic	<1 gram
	Nitrogen Bottle – High Pressure	3,000 psi
	Helium Bottle – High Pressure	6,800 psi
	Launch Rocket Motor. Double Base Propellant	590 grams
	Igniter – Black Powder	4 grams
	Launch Container Squibs (2): Pyrotechnic	<1 gram

Exhibit B-1
Waste Analysis Data (continued)

End Item	Constituents	General or Typical Concentration or Amount
20 mm High Explosive Incendiary Projectile	Cartridge Case: Primer Cartridge Case: Double Base Propellant Projectile: RDX Projectile (earlier models: RDX and MOC – 2B Incendiary Compound Fuse Detonator and Booster – HMX or LCA No. 1 HEI Mix	<1 gram 39 grams (1.4 oz) 11 – 12 grams 2 grams of RDX and 12 grams of MOX – 2B Incendiary Compound <1 gram
105mm Rocket Assisted Projectile (RAP)	Warhead: Comp A Rocket Motor: Fluorocarbon (N-34) Igniter: Primer Igniter Delay Element: Tungsten Powder Igniter Pellets: Fluorocarbon (N-35)	3.3 lbs (1.5 kg) 7 lbs <1 gram 4 grams 4 grams
M117 Inert Bomb	Spotting Charge: Black Powder or Composition C-4	4 lbs (black powder) 6.25 lbs (composition C-4)
M117 Composite Bomb	Filler: TNT Burster: Tetryl	54 lbs 13 lbs
M23 Igniter	Primer and Detonator Booster: Tetryl Filler: White Phosphorous	<1 gram each 12 grams 1.25 lbs
M38A2 Practice Bomb	Spotting charge: Black Powder	Approx. 4.8 lbs
Mk 13 Mod O Igniter	Pellets: Magnesium Primer Transfer Detonator Instantaneous Detonator Delay Detonator Booster Leads Booster: Tetryl	193 each packed in Magnesium powder <1 gram <1 gram <1 gram <1 gram <1 gram 6 grams
Mk 33 Mod 1 Flare	Pyrotechnic Candle: Magnesium Powder and	36 kg (8 lbs)
Warhead	Oxidizer	
	Expelling Charge: Black Powder	20 grams
	Percussion Primer: Primer Mix and Lead Azide	<1gram
	Detonator: Lead Azide and Tetryl	<1 gram
	Booster Lead: Tetryl	<1 gram
	Booster: Black Powder	10 grams

Exhibit B-1
Waste Analysis Data (continued)

End Item	Constituents	General or Typical Concentration or Amount
Air-to-Ground Missile (AGM-65)	Warhead: Comp B Safe and Arm Device: RDX / PETN / Lead Styphnate Safe and Arm Booster: CH-6 Battery: Cadmium Dust Wing Control: Helium Motor: Polysulfide / Ammonium Perchlorate Igniter: Boron / Potassium Nitrate	85 lbs <1 gram 4 oz 4 oz 0.3 cubic ft 3 oz
30mm Projectile High Explosive / Incendiary Filler	RDX Black Powder HMX	7.5 oz 4.2 oz 7.5 oz
Rocket Motor, 2.75”	Double Base Ballistite Black Powder Boron-Potassium Nitrate	6-8 lbs Trace Trace
Rocket Motor, 5”	Double Base Ballistite Boron-Potassium Nitrate	45 lbs Trace
Rocket Warhead, 2.75” High Explosive (4.8 lbs)	RDX TNT Wax	60% 40% 1%
White Phosphorous	WP RDX TNT	2.6 lbs Trace Trace
Rocket Warhead, 5” High Explosive (9.5 lbs)	RDX TNT Wax	60% 40% 1%
White Phosphorous (19 lbs)	WP Tetryl	19 lbs Trace
LUU-2 Flare (22 lbs)	Sodium Nitrate Magnesium Polymeric Binder	36-40% 53-56% 4-8%
MK 46 Decoy Flare	Magnesium	7 oz
MK 376 Bomb Fuse Electric, Tail	Tetryl Lead Azide	4 oz Trace

Exhibit B-1
Waste Analysis Data (continued)

End Item	Constituents	General or Typical Concentration or Amount
Mk 13 Fire Bomb Igniter	Tetryl Magnesium-Teflon Pellets	6 grams 193 each packed in magnesium powder
Target Practice Ammunition 20 mm 25 mm 30 mm 40 mm	Nitrocellulose / Nitroglycerin Charcoal Sulfur Graphite	75.0% 12.5% 12.5% Trace
Detonation Cord	PETN	100%
Detonation Cord	RDX	100%
Safety Fuse	Black Powder	100%
Blasting Cap	Lead Styphnate Lead Azide Mercury Fulminate PETN Tetryl	Varies Varies Varies Varies Varies
Fuse Igniter	Black Powder	100%

Exhibit B-2
Basic Explosive Compositions

End Item	Constituents	General or Typical Concentration or Amount
Tetryl	$C_7H_5N_5O_8$	100%
TNT (Trinitrotoluene)	$C_7H_6N_3O_6$	100%
RDX (Cyclonite)	$C_3H_6N_6O_6$	100%
Lead Azide	PbN_6	100%
Lead Styphnate	$PbC_6H_3N_3O_9$	100%
Nitrocellulose	$CH_6N_3O_8$	100%
Tritonol	TNT (trinitrotoluene) Flaked Aluminum	Varies
Minol	Ammonium Nitrate TNT Powdered Aluminum	Varies
H-6	RDX (cyclonite) TNT Aluminum D-2 Wax Calcium Chloride	45% 30% 20% 5%
Composition B	RDX TNT Wax	60% 40% 1%
Incendiary Mix	Ammonium Perchlorate Aluminum Calcium Stearate Other	35% 52% 1.9% 9.7%
Primer	Lead Azide or Lead Styphnate	Varies
Propellant (exact composition varies by use and types)	Nitrocellulose Nitroglycerin Traces of other chemicals to retard burn	52-98% 2-43%
Black Powder	Potassium (or Sodium) Nitrate Charcoal Sulfur	75% 15% 10%
Illumination Mixture	Sodium Nitrate Magnesium Polymeric Binder	36-40% 53-56% 4-8%
Pink Water	Composition A, B, C, or D	Varies
	TNT	
	RDX	
	HMX (cyclotetramethylenetetranitramine)	

Exhibit B-3
Non-Explosive Compositions

End Item	Constituents	General or Typical Concentration or Amount
M-1 Thickner	Organic Acids from Coconut Oil	50%
	Naphthenic Acids	25%
	Oleic Acid	25%

EXHIBIT B-4

Explosive Ordnance Disposal Information Management System (EODIMS) report

UCN: M0000M027101020241917386 1Z

Title: MUNITION TREATMENT RANGE EXAMPLE REPORT
Department: United States Marine Corps
Unit: MARINE CORPS AIR STATION - YUMA
Originator: E8-MSgt Pawloski Jeramie
Report Type: Incident Report Summary

9-Line — U

Line 1: Date-Time Group
Start Date: Oct 10, 2024 05:17 T (UTC-7)

Line 2: Report Activity/Location

Line 3: Method of Contact
Requester:
CONUS #: Unknown
OCONUS #: Unknown

Line 4: Type of Incident

Line 5: NBC Contamination
Detected: No

Line 6: Target/Resources Threatened
No Threats to Target/Resources Entered

Line 7: Impact on Mission
No Impact Entered

Line 8: Protective Measures
No Measures Entered

Line 9: Recommended Priority
On Base: No
Law Enforcement Support Type: N/A

Incident Site — U

Atmospherics
No Atmospherics Data Recorded

Incident Location
Initial Evacuation Distance: Unknown

Environmental Conditions
No Environmental Condition Data Recorded

Safe Area
No Safe Area Data Recorded

Operating Location
No Operating Location Data Recorded

Evacuation Distance
No Evacuation Distance Data Recorded

Personnel — U

null

Narrative and Analysis — U

Narrative:

EXAMPLE

Date Times

U

Discovery:	Oct 10, 2024 05:17	T (UTC-7)	**DTG Type:**	
Notification:	- - - - -		**Event Time:**	hrs min
Started:	- - - - -		**EOD Personnel:**	0
Departed from Base:	- - - - -		**EOD Time:**	hrs min
Arrived at Scene:	- - - - -		**Off Duty Man-hours:**	0 hrs 0 min
Departed from Scene:	- - - - -		**Non-EOD Personnel:**	0
Returned to Base:	- - - - -		**Non-EOD Time:**	hrs min
Stopped:	- - - - -		**Admin Time:**	1 hrs 0 min
			Total Time:	hrs min

Approval & Return

Err

EXAMPLE

Exhibit B-5

Ordnance Potentially Treated at the MCAS Yuma Munitions Treatment Range

SECTION III

TRANSPORTATION AND STORAGE MANAGEMENT DATA

3-1. GENERAL.

3-2. This section contains a list of explosives arranged in National Stock Number sequence, see table 3-1. Section II contains tables and an explanation of codes used in this section.

3-3. The information is applicable to all Air Force activities that store, ship or otherwise handle explosives as defined by AFR 127-100.

3-4. Postal regulations prohibit mailing of explosives including those that have been exempted from DOT requirements under provisions of Section 173.55, Title 49 CFR.

NOTE

Reference section II for explanation of special symbols used in each column of table 3-1.

Table 3-1. Explosives Hazard Classifications

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1055-00-106-1206	LAUNCHER, LAU 74/A	1	PL	.0013	1.4S	C	BJ	C	0173
1005-00-106-1209	JETTISON ACTUATOR	1	FB	.0013	1.4S	C	BJ	C	0173
1105-00-033-8027CM	WEAPON SUBASSY ATOMIC	1	WB	.0059	1.4S	C	BJ	C	
1105-00-243-2161CM	SPECIAL WEAPON PARA	1	MB	.0030	1.4S	X	XX	OO	0349
1105-00-344-4328CM	PARA & CONTAINER, BOMB	1	*	.0078	1.4S	00	XX	OO	0349
1105-00-689-0951CM	PARA SYS	1	MB	.0078	1.4S	X	XX	OO	0349
1105-00-875-6144CM	RELEASE, PARA	1	WB	.0067	1.4S	C	BJ	C	
1105-00-953-5803CM	PLATE, CLOSING, BALLISTIC CASE	1	WB	.0076	1.4S	C	BJ	C	
1105-00-959-7659CM	WEAPON SUBASSY ATOMIC	1	WB	.0781	1.4S	C	BJ	C	
1105-00-999-3688CM	WEAPON SUBASSY ATOMIC	1	WB	.0781	1.4S	C	BJ	C	
1115-00-014-0527CM	CABLE ASSY	1	FB	.0002	1.4S	C	BE	C	0454
1115-00-072-4933CM	CABLE ASSY	1	FB	.0002	1.4S	C	BE	C	0454
1115-00-150-5899CM	AFT COVERS (BX1)	6	WB	.0550	(04)1.2B	C	BB	C	0107
1115-00-150-5899CM	AFT COVERS (BX2)	1	WB	.0004	1.4S	Y	XK	OO	0349
1115-00-150-5899CM	AFT COVERS (BX3)	2	WB	.0003	(04)1.2B	C	BB	C	0107
1115-00-150-5900CM	MK6 REENTRY VEHICLE (BX1)	6	WB	.0550	(04)1.2B	C	BB	C	0107
1115-00-150-5900CM	MK6 REENTRY VEHICLE (BX2)	1	WB	.0004	1.4S	X	XX	OO	0349
1115-00-150-5900CM	MK6 REENTRY VEHICLE (BX3)	2	WB	.0003	(04)1.2B	C	BB	C	0107
1115-00-224-2186CM	TEST PKG, MIDSECTION	1	MB	N/A	1.4B	C	BB	C	0257
1115-00-227-6643CM	CONTROL BOX ASSY	1	FB	.0009	1.4S	X	XX	OO	0349
1115-00-417-0859CM	SERVICE STAR SAMPLE PACKAGE	1	WB	.3616	1.4C	C	EA	C	0276
1115-00-759-5216CM	INITIATOR SHAPED CHG	*	*	.0013	(04)1.2B	C	BB	C	0107
1115-00-874-4500CM	TURN-AROUND KIT, MK11C	1	WB	.0058	1.4B	C	BB	C	0257
1115-00-994-1721CM	CABLE ASSY	1	FB	.0002	1.4S	C	BE	C	0454
1115-01-075-8224CM	RECORDER DATA PACKAGE	1	MB	.0007	1.4S	Y	XK	OO	0349
1115-01-081-1225CM	ARMING & FUZING ASSY, FWD SEC	1	MB	.0006	8L	COR	FDA	CR	2794
1115-01-083-5017CM	ARMING & FUZING ASSY, FWD SEC	1	MB	.0006	8L	COR	FDA	CR	2794
1115-01-086-6308CM	FWD SECTION, MK12 RV	1	FB	.0810	1.4S	Y	XK	OO	0349
1115-01-099-6503CM	SERVICE STAR (KIT 1) MK12A	1	MB	.0006	8L	COR	FDA	CR	2794
1115-01-101-1715CM	SERVICE STAR KIT	N/A	N/A	N/A	1.3C	C	EA	C	
1115-01-244-0724CM	JOINT INTERFACE TEST ASSY, MK-11C	1	FB	.0020	1.4S	C	EA	C	0323
1135-00-018-7617CM	S & A DEVICE	1	FB	.0042	1.4S	X	XX	OO	0349
1135-00-124-2322CM	S & A DEVICE	1	FB	.0042	1.4S	X	XX	OO	0349
1135-00-124-5591CM	S & A DEVICE	1	FB	.0042	1.4S	X	XX	OO	0349
1135-00-134-7837CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	C	BB	C	0367
1135-00-134-7838CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	C	BB	C	0367
1135-00-150-7415CM	ARMING & FUZING ASSY	1	FB	.0810	1.4S	Y	XK	OO	0349
1135-00-188-6122CM	CABLE ASSY SWITCH	1	FB	.0003	1.4S	X	XX	OO	0349
1135-00-415-5366CM	INITIATOR RESERVOIR	1	FB	.0810	8L	COR	YF	*CR	2796
1135-00-455-2912CM	ARMING & FUZING ASSY	1	FB	.0004	8L	COR	YF		2796
1135-00-905-4136CM	AF/ACC ASSY	1	FB	.0042	1.4S	C	BB	C	0367

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1135-00-905-4144CM	ARMING & FUZING ATT CONT	1	FB	N/A	1.4S	X	XX	OO	0349
1135-00-930-2118CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	C	BB	C	0367
1135-00-999-4298CM	S & A DEVICE	1	FB	.0042	1.4S	X	XX	OO	0349
1135-00-999-5322CM	AF/AC ASSY	1	FB	.0042	1.4S	C	BB	C	0367
1135-01-011-2169CM	TEST SAMPLE, JOINT INTERFACE	1	MB	.0009	1.4S	X	XX	OO	0349
1135-01-033-9561CM	EXPL ASSY	1	N/A	N/A	1.4S	C	BE	C	0454
1135-01-049-0590CM	MKR	1	N/A	.0012	1.4G	C	BE	C	
1135-01-070-6412CM	GEN GAS	1	N/A	.0003	1.4S	C	EA	C	
1135-01-078-9388CM	GEN GAS	1	N/A	.0003	1.4S	C	EA	C	
1135-01-083-5019CM	ARMING & FUZING ASSY, FWD SEC	1	MB	.0006	1.4L	COR	FDA	CR	2796
1135-01-116-3500CM	CABLE CUTTER	1	WB	N/A	1.4S	C	XX	OO	
1135-01-149-2063CM	MK-11C A&F/AC	1	FB	N/A	1.4S	X	XX	OO	0349
1135-01-190-5477CM	MK21 FUZE	1	MC	.0009	1.4S	Y	XX	OO	0349
1135-01-194-9166	RV REAR COVER	1	WB	*	1.3C	B	EM	B	0186
1135-01-227-5147CM	SWITCH, SQUIB ACTIVATED	4	FB	.0003	1.4S	X	XX	OO	0349
1135-01-252-4201CM	BOX 1 OF 3 RE-ENTRY VEHICLE (INERT)	1	WB	N/A	N/A	N/A	N/A	N/A	N/A
1135-01-252-4201CM	BOX 2 OF 3 RV REAR COVER	1	WB	*	1.3C	B	EM	B	0186
1135-01-252-4201CM	BOX 3 OF 3 DELAY INITIATOR	*	FB	.0030	1.4S	C	BW	C	0454
1135-01-266-2740CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	C	BB	C	0367
1135-01-273-4839CM	FUZE, MK21	1	MC	.0009	1.4S	Y	XX	OO	0349
1135-01-318-3893CM	MK-21 RV BUILD-UP SET	1	N/A	*	1.3C	B	EM	B	0186
1145-00-074-1828CM	CTG, IMPULSE	1	FB	.0047	1.4S	C	BJ	C	
1145-00-443-7976CM	GEN, GAS PRESSURE	1	FB	N/A	1.4S	C	EA	C	
1145-00-509-6605CM	GEN GAS	1	N/A	N/A	1.4S	C	EA	C	
1145-00-947-9523CM	BOLT, EXPL	1	FB	.0013	1.4S	C	BJ	C	
1145-01-007-0458CM	GEN, GAS PRESSURE	1	FB	.2316	1.4S	C	EA	C	
1145-01-016-7510CM	CABLE ASSY	1	N/A	.0049	1.4S	C	BB	C	
1190-01-057-9645CM	REEFING CUTTER & CABLE ASSY	1	FB	.0003	1.4S	C	BG	C	
1190-01-102-3589CM	SERVICE STAR SAMPLE KIT	1	FB	.0810	1.4S	Y	XK	OO	0349
1305-00-009-4255	PROJECTILES, 20MM HE1	*	*	.0285	(04)1.1D	A	BI	A	0168
1305-00-028-4556	CTG, 20MM, M96, INC	165	WB	.0775	(04)1.2G	A	EN	A	0009
1305-00-028-6146	CTG, CAL .30, M1	1680	WB	.0021	1.4S	C	DC	OO	0012
1305-00-028-6152	CTG, CAL .30, M1	1600	WB	.0021	1.4S	C	DC	OO	0012
1305-00-028-6157	CTG, CAL .30, M2	1500	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6168	CTG, CAL .30, M2	480	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6171	CTG, CAL .30, M2	1344	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6190	CTG, CAL .30, M2	480	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6195	CTG, CAL .30, M2	1500	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6207	CTG, CAL .30, M2	1344	WB	.0074	1.4S	C	DC	OO	0012

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-00-028-6208	CTG, CAL .30, M2	480	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6215	CTG, CAL .30, M2	764	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6261	CTG, CAL .30, M1TR	1500	WB	.0020	1.4S	C	DC	OO	0012
1305-00-028-6285	CTG, CAL .30, M25TR	480	WB	.0072	1.4S	C	DC	OO	0012
1305-00-028-6288	CTG, CAL .30, M25TR	960	WB	.0072	1.4S	C	DC	OO	0012
1305-00-028-6296	CTG, CAL .50, M2	350	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6309	CTG, CAL .50, AP, M2	210	WC	.0039	1.4C	C	DC	OO	0339
1305-00-028-6341	CTG, CAL .50, M2	210	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6346	CTG, CAL .50, M2, M17	210	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6348	CTG, CAL .50, M2, M17	110	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6355	CTG, CAL .50, M2	210	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6355	CTG, CAL .50, M2	210	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6367	CTG, CAL .50, M2	265	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6369	CTG, CAL .50, M2	110	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6375	CTG, CAL .50, M2	240	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6380	CTG, CAL .50, BLANK	200	WC	.0069	1.4C	C	DC	OO	0338
1305-00-028-6464	CTG, CAL .50, M8	240	WB	.0336	1.4G	C	DC	OO	0300
1305-00-028-6466	CTG, CAL .50, M8, M20	210	WC	.0336	1.4G	C	DC	OO	0300
1305-00-028-6474	CTG, CAL .50, M8	210	WC	.0336	1.4G	C	DC	OO	0300
1305-00-028-6475	CTG, CAL .50, M8	210	WC	.0336	1.4G	C	DC	OO	0300
1305-00-028-6476	CTG, CAL .50, M8	210	WC	.0336	1.4G	C	DC	OO	0300
1305-00-028-6477	CTG, CAL .50, M8	265	WB	.0336	1.4G	C	DC	OO	0300
1305-00-028-6480	CTG, CAL .50, M8	110	WB	.0336	1.4G	C	DC	OO	0300
1305-00-028-6491	CTG, CAL .50, M8, M20	265	WB	.0336	1.4G	C	DC	OO	0300
1305-00-028-6507	CTG, CAL .30, M1	1600	WB	.0021	1.4S	C	DC	OO	0012
1305-00-028-6509	CTG, CAL .30, M1	1200	WB	.0021	1.4S	C	DC	OO	0012
1305-00-028-6510	CTG, CAL .30, M27	1200	WB	.0019	1.4S	C	DC	OO	0012
1305-00-028-6524	CTG, CAL .30, M2	960	WC	.0074	1.4S	C	DC	OO	0012
1305-00-028-6535	CTG, CAL .30, M2	1040	WB	.0074	1.4S	C	DC	OO	0012
1305-00-028-6542	CTG, CAL .30, M2, M1	1000	WC	.0074	1.4S	C	DC	OO	0012
1305-00-028-6562	CTG, CAL .50, M2, M17	100	MB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6570	CTG, CAL .50, M33	200	WB	.0342	1.4C	C	DC	OO	0339
1305-00-028-6572	CTG, CAL .50, M2, M17	224	WB	.0339	1.4C	C	DC	OO	0339
1305-00-028-6574	CTG, CAL .50, BALL	200	WB	.0342	1.4C	C	DC	OO	0339
1305-00-028-6575	CTG, CAL .50, M33	200	WB	.0342	1.4C	C	DC	OO	0339
1305-00-028-6577	CTG, CAL .50, M33	221	WB	.0342	1.4C	C	DC	OO	0339
1305-00-028-6578	CTG, CAL .50, M33	220	WB	.0342	1.4C	C	DC	OO	0339
1305-00-028-6580	CTG, CAL .50, M33	210	WB	.0342	1.4C	C	DC	OO	0339
1305-00-028-6582	CTG, CAL .50, M33, M17	200	WB	.0342	1.4C	C	DC	OO	0339

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-00-028-6583	CTG, CAL .50, M33, M17	200	WB	.0342	1.4C	C	DC	OO	0339
1305-00-028-6588	CTG, CAL .50, M8	224	WB	.0336	1.4G	C	DC	OO	0300
1305-00-028-6590	CTG, CAL .50, M8	200	WB	.0336	1.4G	C	DC	OO	0300
1305-00-028-6592	CTG, CAL .50, M8	200	WB	.0336	1.4G	C	DC	OO	0300
1305-00-028-6594	CTG, CAL .50, M1	224	WB	.0346	1.4G	C	DC	OO	0300
1305-00-028-6603	CTG, CAL .50, M8, M20	200	WC	.0336	1.4G	C	DC	OO	0300
1305-00-028-6609	CTG, CAL .50, M17	200	WC	.0325	1.4C	C	DC	OO	0339

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-00-028-6616	CTG, CAL .45, M1911	1200	WC	.0008	1.4S	C	DC	OO	0012
1305-00-028-6629	CTG, CAL .38, M41	1200	WB	.0006	1.4S	C	DC	OO	0012
1305-00-028-6635	CTG, CAL .45, BLANK, M9	1200	WB	.0011	1.4S	C	DC	OO	0014
1305-00-028-6636	CTG, CAL .45, BLANK, M9	2000	WB	.0011	1.4S	C	DC	OO	0014
1305-00-028-6637	CTG, CAL .45, BLANK, M9	1200	WB	.0011	1.4S	C	DC	OO	0014
1305-00-028-6644	CTG, .410 GAGE, SHOTGUN	450	WB	.0011	1.4S	C	DC	OO	0012
1305-00-047-3871	CTG, CAL .30, BLANK, M1909	1240	WC	.0041	1.4S	C	DC	OO	0014
1305-00-057-1876	CTG, 5.56MM, M193	720	FB	.0051	1.4S	C	DC	OO	0012
1305-00-064-2896	CTG, 7.62MM, M118	920	WC	.0064	1.4S	C	DC	OO	0012
1305-00-078-8220	CTG, 20MM, M55A2, M220	1000	MB	.0861	1.4C	C	DC	OO	0339
1305-00-096-3141	CTG, CAL .50, M2	200	WB	.0339	1.4C	C	DC	OO	0339

Pages 3-4A and 3-4B are deleted in their entirety.

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-00-096-3150	CTG, CAL .30, M2	800	WC	.0074	1.4S	C	DC	OO	0012
1305-00-096-3168	CTG, .410 GAGE, SHOTGUN, M35	500	WB	.0011	1.4S	C	DC	OO	0012
1305-00-117-2796	CTG, 20MM, M56A3, M53, HEI/API	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-123-0548	CTG, CAL .38	2500	WB	.0006	1.4S	C	DC	OO	0012
1305-00-143-7049	CTG, 20MM, M95, M96, APT, INC	150	MB	.0775	(04)1.2G	A	EN	A	0009
1305-00-143-7050	CTG, 20MM, M95, M96, APT, INC	150	MB	.0775	(04)1.2G	A	EN	A	0009
1305-00-143-7167	CTG, 20MM, M96, INC	150	MB	.0775	(04)1.2G	A	EN	A	0009
1305-00-143-7168	CTG, 20MM, M96, INC	150	WB	.0775	(04)1.2G	A	EN	A	0009
1305-00-143-7176	CTG, 20MM, M210, M96, HEI, INC	150	MB	.0171	(04)1.2E	A	AK	A	0321
1305-00-144-5527	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-144-5545	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	C	DC	OO	0339
1305-00-147-5568	CTG, 12 GAGE SHOTGUN	240	WC	.0029	1.4S	C	DC	OO	0012
1305-00-152-3292	CTG, 7.62MM, M80, M62	1500	MC	.0067	1.4S	C	DC	OO	0012
1305-00-152-3662	CTG, 20MM, M56A3, M242, HEI/HEIT	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-169-1880	CTG, 20MM, M56A3, M53, HEI, API	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-169-8805	CTG, 20MM, API-T	100	WB	.1011	1-4G	A	EN	A	0300
1305-00-180-9268	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	C	DC	OO	0339
1305-00-180-9270	CTG, 20MM, M210, M96, M95, HEI/API/INC	150	MB	.0171	(04)1.2E	A	AK	A	0321
1305-00-180-9271	CTG, 20MM, M210, M96, M95, HEI/API/INC	150	MB	.0171	(04)1.2E	A	AK	A	0321
1305-00-182-3081	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-182-3217	CTG, 5.56MM, BLANK, M200	2280	MC	.0011	1.4S	C	DC	OO	0014
1305-00-182-3254	CTG, 20MM, M55A2, M220	100	MB	.0861	1.4C	C	DC	OO	0339
1305-00-186-0204	CTG, CAL .32, BLANK	50	FB	.0003	1.4S	C	DC	OO	0014
1305-00-204-0848	CTG, .410 GAGE, SHOTGUN	500	FB	.0011	1.4S	C	DC	OO	0012
1305-00-262-4181	CTG, 20MM, M56A2, HEI	200	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-301-1589	CTG, 20MM, T221E2, API	56	WB	.0954	1.4G	A	EN	A	0300
1305-00-301-1661	CTG, CAL .30, M1	1680	WC	.0021	1.4S	C	DC	OO	0012
1305-00-301-1663	CTG, CAL .30, M27	2160	WC	.0019	1.4S	C	DC	OO	0012
1305-00-301-1665	CTG, CAL .30, M2	768	WC	.0074	1.4S	C	DC	OO	0012
1305-00-301-1670	CTG, CAL .30, BLANK, M1909	960	WC	.0018	1.4S	C	DC	OO	0014
1305-00-301-1685	CTG, CAL .45, M1911	2000	WC	.0008	1.4S	C	DC	OO	0012
1305-00-301-1691	CTG, CAL .38, WADCUTTER	2000	WB	.0004	1.4S	C	DC	OO	0012
1305-00-301-1692	CTG, CAL .38, M41	1500	WB	.0006	1.4S	C	DC	OO	0012
1305-00-301-1694	CTG, CAL .45, BLANK, M9	900	WB	.0011	1.4S	C	DC	OO	0014
1305-00-301-1696	CTG, CAL .45, LINE THROWING, M32	330	WB	.0072	1.4S	C	DC	OO	0014
1305-00-305-0894	CTG, CAL .50, M23	200	WC	.0342	1.4G	C	DC	OO	0300
1305-00-305-0902	CTG, CAL .22	10,200	WC	.0003	1.4S	C	DC	OO	0012
1305-00-308-5569	CTG, 20MM, M54, HPT	200	MB	.0861	1.4C	C	DC	OO	0339
1305-00-308-5810	CTG, 9MM, M1	3840	WB	.0009	1.4S	C	DC	OO	0012
1305-00-322-6359	CTG, 30MM, TP	64	WB	.3400	(04)1.2C	B	AH	B	0328
1305-00-322-6391	CTG, CAL .38, M41	2400	WC	.0006	1.4S	C	DC	OO	0012

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-00-416-5809	CTG, 30MM, APIT, PGU-14/B (AERO)	36	MB	.3419	1.4C	B	AH	B	0339
1305-00-416-5813	CTG, 30MM, TP, PGU-15/B (AERO)	36	MB	.3308	1.4C	B	AH	B	0339
1305-00-416-5814	CTG, 30MM, HEI, PGU-13/B (AERO)	36	MB	.0916	(04)1.2E	A	AB	A	0321
1305-00-522-3700	CTG, 20MM, M220E1, TPT	200	MB	.0915	1.4C	C	DC	OO	0339
1305-00-529-8878	CTG, CAL .22, HORNET, M65	2000	WB	.0019	1.4S	C	DC	OO	0012
1305-00-540-7862	CTG, CAL .45, WADCUTTER	1500	WB	.0008	1.4S	C	DC	OO	0012
1305-00-540-9132	CTG, CAL .30, M1	4800	WB	.0021	1.4S	C	DC	OO	0012
1305-00-540-9461	CTG, CAL .30, M2	1320	WC	.0074	1.4S	C	DC	OO	0012
1305-00-540-9488	CTG, CAL .30, M2	500	WB	.0074	1.4S	C	DC	OO	0012
1305-00-541-9834	CTG, CAL .50, M2, M17	200	WC	.0339	1.4C	C	DC	OO	0339
1305-00-542-0405	CTG, 20MM, M55A2, TP	100	WB	.0861	1.4C	C	DC	OO	0339
1305-00-542-0518	CTG, 20MM, M56A1, HEI	54	WB	.0285	(04)1.2E	A	AK	A	0321
1305-00-542-1120	CTG, 20MM, M56A1E1, HEI	52	WB	.0285	(04)1.2E	A	AK	A	0321
1305-00-542-1196	CTG, 7.62MM, M80, M62	400	WC	.0067	1.4S	C	DC	OO	0012
1305-00-542-1968	CTG, 7.62MM, M80	800	WC	.0067	1.4S	C	DC	OO	0012
1305-00-546-5830	CTG, CAL .30, M72	960	WC	.0072	1.4S	C	DC	OO	0012
1305-00-553-4779	CTG, CAL 38SP, PGU-12/B, BALL	2000	FB	.0008	1.4S	C	DC	OO	0012
1305-00-554-6709	CTG, 20MM, M56A1, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-555-4055	CTG, CAL .50, M8	210	WC	.0336	1.4G	C	DC	OO	0300
1305-00-555-4056	CTG, CAL .50, M33	200	WC	.0342	1.4C	C	DC	OO	0339
1305-00-555-4057	CTG, CAL .50, M8	200	WC	.0336	1.4G	C	DC	OO	0300
1305-00-555-4059	CTG, CAL .50, M8	440	WB	.0336	1.4G	C	DC	OO	0300
1305-00-565-2636	CTG, CAL .30, M72	800	WC	.0072	1.4S	C	DC	OO	0012
1305-00-585-5187	CTG, CAL .50, M17	*	*	.0325	1.4C	C	DC	OO	0339
1305-00-585-5188	CTG, CAL .50, M17	240	WC	.0325	1.4C	C	DC	OO	0339
1305-00-585-5368	CTG, CAL .50, M2	200	WB	.0339	1.4C	C	DC	OO	0339
1305-00-585-5383	CTG, CAL .50, M8	200	WB	.0339	1.4G	C	DC	OO	0300
1305-00-684-1877	CTG, CAL .45, WADCUTTER	1000	WB	.0008	1.4S	C	DC	OO	0012
1305-00-690-5118	CTG,CAL .22	5000	FB	.0003	1.4S	C	DC	OO	0012
1305-00-723-2552	CTG, 20MM, M56A1E1, HEI	54	WB	.0285	(04)1.2E	A	AK	A	0321
1305-00-752-8087	CTG, 7.62MM, BLANK, XM82	800	WC	.0022	1.4S	C	DC	OO	0014
1305-00-752-8114	CTG, 20MM, TP, M55A2	200	MB	.0861	1.4C	C	DC	OO	0339
1305-00-752-8833	CTG, 20MM, M56A1E1, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-752-8837	CTG, 7.62MM, BALL, M80	840	WB	.0067	1.4S	C	DC	OO	0012
1305-00-756-1675	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	C	DC	OO	0339
1305-00-764-8436	CTG, 5.56MM, BLANK, XM200	2080	WC	.0011	1.4S	C	DC	OO	0014
1305-00-776-4639	CTG, CAL .45, M1911	1000	FB	.0008	1.4S	C	DC	OO	0012
1305-00-776-4640	CTG, CAL .38	1200	FB	.0006	1.4S	C	DC	OO	0012
1305-00-783-5482	CTG, 20MM, M56A3, M242, HEI/HEIT	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-785-2829	CTG, 20MM, M220, TPT	200	MB	.0861	1.4C	C	DC	OO	0339
1305-00-810-8250	CTG, CAL .38, BLANK	2000	*	.0006	1.4S	C	DC	OO	0014

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-00-819-6017	CTG, CAL .22	*	*	.0003	1.4S	C	DC	OO	0012

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		=RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-00-834-5509	CTG, 20MM, T221E2, API	100	MB	.0954	1.4G	A	EN	A	0300
1305-00-849-4535	CTG, 20MM, M53, API	100	MB	.0954	1.4G	A	EN	A	0300
1305-00-850-3676	CTG, 20MM, M56A2, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-850-3986	CTG, 20MM, M53, API	100	MB	.0954	1.4G	A	EN	A	0300
1305-00-880-2112	CTG, 20MM, M210, HEI	150	MB	.0171	(04)1.2E	A	AK	A	0321
1305-00-880-7148	CTG, 20MM, M210, HEI	150	MB	.0171	(04)1.2E	A	AK	A	0321
1305-00-889-2042	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-889-2043	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-889-2169	CTG, 7.62MM, M80, M62	800	WC	.0067	1.4S	C	DC	OO	0012
1305-00-892-2150	CTG, 7.62MM, M80, M62	800	WC	.0067	1.4S	C	DC	OO	0012
1305-00-892-2161	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	C	DC	OO	0339
1305-00-892-2162	CTG, 20MM, M56A2, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-892-2330	CTG, 7.62MM, M80	800	WC	.0067	1.4S	C	DC	OO	0012
1305-00-892-2526	CTG, CAL .45, M1911	2000	WC	.0008	1.4S	C	DC	OO	0012
1305-00-892-4157	CTG, CAL .30 MATCH, M72	960	WB	.0072	1.4S	C	DC	OO	0012
1305-00-892-4230	CTG, CAL .45, M1911	1000	MC	.0008	1.4S	C	DC	OO	0012
1305-00-892-4254	CTG, 12 GAGE, SHOTGUN, XM162	240	WC	.0038	1.4S	C	DC	OO	0012
1305-00-892-4321	CTG, 20MM, M56E2, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-914-4675	CTG, 7.62MM, BALL M80	840	WB	.0067	1.4S	C	DC	OO	0012
1305-00-914-4719	CTG, 5.56MM, XM196	1640	WC	.0041	1.4S	C	DC	OO	0012
1305-00-926-3930	CTG, 5.56MM, M193	1680	WC	.0041	1.4S	C	DC	OO	0012
1305-00-926-3942	CTG, 7.62MM, M80, M62	1500	MC	.0067	1.4S	C	DC	OO	0012
1305-00-926-3963	CTG, CAL .30, M1	2700	WC	.0021	1.4S	C	DC	OO	0012
1305-00-926-3970	CTG, 5.56MM, M193	1640	WC	.0041	1.4S	C	DC	OO	0012
1305-00-926-4017	CTG, 7.62MM, M62 TRACER	920	WC	.0066	1.4S	C	DC	OO	0012
1305-00-926-4057	CTG, 20MM, M55A2, M220	100	MB	.0915	1.4C	C	DC	OO	0339
1305-00-926-4058	CTG, 20MM, M56A3, M220, HEI/TPT	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-926-4059	CTG, 20MM, M55A2, M220, TP/TPT	100	MB	.0915	1.4C	C	DC	OO	0339
1305-00-926-4060	CTG, 20MM, M56A3, M220, HEI/TPT	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-926-9302	CTG, 5.56MM, BLANK	1880	WB	.0011	1.4S	C	DC	OO	0014
1305-00-935-2019	CTG, 20MM, M54, HPT	200	MB	.0861	1.4C	C	DC	OO	0339
1305-00-935-6059	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-935-6060	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	C	DC	OO	0339
1305-00-935-6164	CTG, 9MM	1536	WB	.0009	1.4S	C	DC	OO	0012
1305-00-935-6171	CTG, 20MM, XM242, HEI-T	200	MB	.0251	(04)1.2E	A	AK	A	0321
1305-00-935-9104	CTG, 20MM, M56A3, HEI	200	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-935-9247	CTG, 7.62MM, M80	1500	MC	.0067	1.4S	C	DC	OO	0012
1305-00-965-0559	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	C	DC	OO	0339
1305-00-965-0560	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-00-965-0775	CTG, 5.56MM, M193, BALL	1000	FB	.0041	1.4S	C	DC	OO	0012
1305-00-965-0832	CTG, 5.56MM, XM196	1440	WC	.0041	1.4S	C	DC	OO	0012

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	DOD HAZARD CLASS DOT CODES MKG 8	DOD HAZARD CLASS DOT CODES LAB 9	DOD HAZARD CLASS DOT CODES SER 10
1305-00-965-0873	CTG, 20MM, M204, TP	150	MB	.0718	1.4C	C	DC	OO	0339
1305-00-968-5892	CTG, 5.56MM, M193	1400	WC	.0041	1.4S	C	DC	OO	0012
1305-01-010-0258	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	C	DC	OO	0339
1305-01-011-6324	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-023-1907	CTG, 30MM, PGU-15/B, TP (HONEY)	36	MB	.3310	1.4C	B	AH	B	0339
1305-01-023-1908	CTG, 30MM, PGU-13/B, HEI (HONEY)	36	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-023-1909	CTG, 30MM, PGU-14/B, APIT (HONEY)	36	MB	.3389	1.4C	B	AH	B	0339
1305-01-056-4626	CTG, 30MM, PGU-14A/B, & PGU-13/B (5 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-056-4906	CTG, 20MM, TP, M55A2	230	MC	.0861	1.4C	C	DC	OO	0339
1305-01-056-4907	CTG, 30MM, PGU-14A/B, & PGU-13/B (5 TO 1 RATIO) (HONEY)	588	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-057-5335	CTG, 30MM, PGU-13/B, HEI (AERO)	588	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-057-7912	CTG, 30MM, PGU-14A/B, API (HONEY)	36	MB	.3389	1.4C	B	AH	B	0339
1305-01-057-7913	CTG, 30MM, PGU-14A/B, B/B, API (AERO)	36	MB	.3419	1.4C	B	AH	B	0339
1305-01-057-7914	CTG, 30MM, PGU-15/B, TP (AERO)	588	MB	.3308	1.4C	B	AH	B	0339
1305-01-059-2594	CTG, 30MM, PGU-15/B, TP (HONEY)	588	MB	.3310	1.4C	B	AH	B	0339
1305-01-061-2213	CTG, 20MM, TP/TPT	100	MB	.0861	1.4C	C	DC	OO	0339
1305-01-061-2214	CTG, 30MM, PGU-14/B & PGU-13/B (5 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-062-0070	CTG, 30MM, PGU-15/B & PGU-13/B (2 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-062-0071	CTG, 30MM, PGU-15/B & PGU-13/B (2 TO 1 RATIO) (HONEY)	588	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-063-2167	CTG, 30MM, PGU-14/B & PGU-13/B (5 TO 1 RATIO) (HONEY)	588	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-063-2168	CTG, 30MM, PGU-13/B, HEI (HONEY)	588	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-078-4879	CTG, CAL .50, BLANK, M1A1	200	WC	.0068	1.4C	C	DC	OO	0338
1305-01-083-5998	CTG, 30MM, PGU-14B/B & PGU-13/B (5 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-090-7526	CTG, 30MM, HIGH PRESSURE TEST	36	MB	.3313	1.4C	B	AH	B	0339
1305-01-093-3338	CTG, 30MM, PGU-15/B, TP (HONEY)	575	MB	.3310	1.4C	B	AH	B	0339
1305-01-093-3339	CTG, 30MM, PGU-13/B, HEI (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-093-3340	CTG, 30MM, PGU-14A/B & PGU-13/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-093-9568	CTG, 30MM, PGU-15/B, TP (AERO)	575	MB	.3308	1.4C	B	AH	B	0339
1305-01-095-1062	CTG, 30MM, PGU-14B/B AND PGU-13/B (5 TO 1 RATIO) (AERO)	575	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-095-9650	CTG, 30MM, PGU-13/B, HEI (AERO)	575	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-109-6985	CTG, 30MM, PGU-13A/B, HEI (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-01-111-6977	CTG, 30MM, HIGH PRESSURE TEST (AERO)	575	MB	.3313	1.4C	B	AH	B	0339
1305-01-113-2462	CTG, 30MM, PGU-14A/B, AND PGU-13A/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-116-3928	CTG, 20MM, M56A4, M242, HEI/HEIT	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-116-3930	CTG, 20MM, HPT	250	MB	.0861	1.4C	C	DC	OO	0339
1305-01-116-3931	CTG, 20MM, M56A3, HEI	250	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-116-3932	CTG, 20MM, M56A4, M220, HEI/TPT	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-116-3935	CTG, 20MM, M56A4, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-116-4560	CTG, 20MM, M55A2, TP	250	MB	.0861	1.4C	C	DC	OO	0339
1305-01-116-4959	CTG, 5.56MM BALL, PLASTIC	2000	FB	.0013	1.4S	C	DC	OO	0012
1305-01-118-9928	CTG, 20MM, M56A4, HEI	250	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-118-9929	CTG, 20MM, M242, HEI-T	250	MB	.0251	(04)1.2E	A	AK	A	0321
1305-01-118-9930	CTG, 20MM, M220, TP-T	250	MB	.0861	1.4C	C	DC	OO	0339
1305-01-119-6068	CTG, 20MM, M56A4, HEI	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-119-7862	CTG, 20MM, M56A4, M242, HEI/HEIT	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-120-0970	CTG, 7.62MM M852	460	MB	.0064	1.4S	C	DC	OO	0012
1305-01-136-3622	CTG, 25MM TP, PGU-23/U	80	MB	.2095	1.4C	B	XW	B	0339
1305-01-140-8530	CTG, 30MM, PGU-15/B, TP (HONEY)	575	MB	.3310	1.4C	B	AH	B	0339
1305-01-141-6054	CTG, 30MM, PGU-15/B, TP (AERO)	575	MB	.3308	1.4C	B	AH	B	0339
1305-01-143-8592	CTG, 5.56MM, M193/M196 (2 TO 1 RATIO)	1680	WC	.0051	1.4S	C	DC	OO	0012
1305-01-144-9301	CTG, 30MM, PGU-13A/B, HEI (AERO)	575	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-146-1530	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO)	575	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-155-5459	CTG, 5.56MM, M855	1680	WC	.0036	1.4S	C	DC	OO	0012
1305-01-156-7584	CTG, 5.56MM, BALL/TRACER (4 TO 1 RATIO)	200	MB	.0036	1.4S	C	DC	OO	0012
1305-01-157-2627	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO) (AERO)	575	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-161-0621	CTG, 30MM, PGU-13A/B HEI (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-161-0622	CTG, 30MM, PGU-14A/B & PGU-13A/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-161-0623	CTG, 30MM, PGU-13A/B HEI (AERO)	575	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-172-9558	CTG, 9MM, XM882	1000	MB	.0009	1.4S	C	DC	OO	0012
1305-01-181-1295	CTG, 30MM, HPT	575	MB	.3313	1.4C	B	AH	B	0339
1305-01-199-6737	CTG, 25MM, PGU-25	100	MB	.0662	(04)1.2E	A	AB	A	0321
1305-01-209-4292	CTG, 20MM, HEI, M56A2	100	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-211-6248	CTG, 20MM, HEI, M56A1	250	MB	.0285	(04)1.2E	A	AK	A	0321
1305-01-213-9656	CTG, 20MM TP, PGU-27/B	250	MB	.0861	1.4C	C	DC	OO	0339
1305-01-213-9657	CTG, 20MM TPT, PGU-30/B	250	MB	.0891	1.4C	C	DC	OO	0339
1305-01-213-9658	CTG, 20MM SAPHEI, PGU-28/B	250	MB	.0223	(04)1.2E	A	AK	A	0321

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1305-01-225-8202	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-225-8203	CTG, 30MM, PGU-13A/B HEI (HONEY)	575	MB	.1019	(04)1.2E	A	AB	A	0321
1305-01-225-8204	CTG, 30MM, PGU-15/B TP (HONEY)	575	MB	.3310	1.4C	B	AH	B	0339
1305-01-232-6180	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO) (AERO)	575	MB	.0916	(04)1.2E	A	AB	A	0321
1305-01-232-8338	CTG, 12 GAGE, SHOTGUN	320	WC	.0038	1.4S	C	DC	OO	0012
1305-01-252-0153	CTG, 5.56MM, BALL/TRACER (4 TO 1 RATIO)	1600	MB	.0037	1.4S	C	DC	OO	0012
1305-01-255-6276	CTG, 5.56, M193	1680	WC	.0041	1.4S	C	DC	OO	0012
1305-01-258-8694	CTG, 5.56MM, BLANK	1600	MB	.0010	1.4S	C	DC	OO	0014
1310-00-039-1119	CTG,40MM, M81A1, AP	16	MB	.7200	(08)1.2C	B	AH	B	0328
1310-00-039-1123	CTG, 40MM, M81A1, AP-T	16	MB	.6700	(08)1.2C	B	AH	B	0328
1310-00-039-1182	CTG, 40MM, MK2, HEP	16	MB	.8700	(08)1.2E	A	AB	A	0321
1310-00-039-1187	CTG, 40MM, MK2, HEIT-NSD	16	MB	.8700	(08)1.2E	A	AB	A	0321
1310-00-039-1254	CTG, 40MM, MK2, HEIP	16	MB	.8700	(08)1.2E	A	AB	A	0321
1310-00-133-9413	CTG, 40MM, M676	N/A	N/A	N/A	1.4G	C	DG	C	0197
1310-00-143-8863	CTG, 40MM, M384, HE	50	WB	.1169	(12)1.1E	A	AB	A	0006
1310-00-159-3198	CTG, SIGNAL, 40MM, WHITE STAR	44	WC	.2069	1.4G	C	DB	C	0312
1310-00-179-1159	CTG, 40MM, M679	N/A	N/A	.1306	1.4G	C	DG	C	0197
1310-00-180-9359	CTG, 40MM, M385, PRAC	50	WB	.0100	1.4C	C	EW	C	0339
1310-00-238-6559	CTG, 40MM, HEI-P	50	WB	.8700	(08)1.2E	A	AB	A	0321
1310-00-541-6150	CTG, 40MM, M713, RED SMK	44	WC	.1722	1.4G	C	DG	C	0197
1310-00-541-6152	CTG, 40MM, M715, GREEN SMK	44	WC	.1722	1.4G	C	DG	C	0197
1310-00-541-6153	CTG, 40MM, M716, YELLOW SMK	44	WC	.1722	1.4G	C	DG	C	0197
1310-00-554-0092	CTG, 40MM, M81A1, AP-T	16	MB	.6700	(08)1.2C	B	AH	B	0328
1310-00-724-8081	CTG, 40MM, M406, HE	72	WB	.0780	(04)1.2E	A	AB	A	0321
1310-00-849-2083	CTG, 40MM, XM651E1 (B)	24	WB	.1250	1.4G	C	DD	IR	0301
1310-00-867-6609	CTG, GRENADE, 40MM, HEDP, M430	50	WB	.0838	(04)1.1E	A	AB	A	0006
1310-00-922-9780	CTG, 40MM, XM583, ILL	44	WB	.2080	1.4G	C	DB	C	0312
1310-00-922-9784	CTG, 40MM, XM585, ILL	44	WC	.1910	1.4G	C	DB	C	0312
1310-00-935-9229	CTG, 40MM, M674, (CS) (B)	32	WC	.2156	1.4G	C	DD	IR	0301
1310-00-935-9230	CTG, 40MM, XM675, SMK	32	WC	.2168	1.4G	C	DG	C	0303
1310-00-963-4061	CTG, 40MM, XM576, ANTI-PER	72	WB	.0038	1.4S	C	DC	OO	0012
1310-00-965-0738	CTG, 40MM, M407A1, PRAC	72	WB	.0008	(04)1.2G	C	EW	C	0015
1310-00-976-0908	CTG, 40MM, HE, M384	50	WB	.1169	(12)1.1E	A	AB	A	0006
1310-00-992-0451	CTG, 40MM, XM433E1, HE	72	WB	.1040	(04)1.1E	A	AB	A	0006
1310-00-994-7441	CTG, 40MM, PRAC, M385	50	WB	.0100	1.4C	C	EW	C	0339
1310-01-033-8282	CTG, 40MM, HEI-P, M162	16	WB	.8560	(08)1.2E	A	AB	A	0321
1310-01-050-7967	CTG, 40MM, M781, TP	75	WB	.0007	1.4C	C	EW	C	0339
1310-01-148-8881	CTG, 40MM, PRACTICE M781	100	WB	.0008	1.4C	C	EW	C	0339

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	DOD HAZARD CLASS DOT CODES MKG 8	DOD HAZARD CLASS DOT CODES LAB 9	DOD HAZARD CLASS DOT CODES SER 10
1310-01-159-3184	CTG, 40MM, PRACTICE M385A1		48	MB	.0104	1.4C	C	EW	C	0339
1310-01-159-8043	CTG, 40MM, M430		48	MB	.0838	(04)1.1E	A	AB	A	0006
1310-01-211-8073	CTG, 40MM, PRACTICE M781		100	WB	.0008	1.4C	C	EW	C	0339
1310-01-218-7069	CTG, 40MM TP, M918		48	WB	.0006	1.4C	C	EW	C	0339
1315-00-021-6478	CTG, 105MM, M60 SMK, WP	(C)	2	WB	7.1	(12)1.2H	A	AG	A	0245
1315-00-028-4859	CTG, 105MM, HE, M1, W/O FUZE		2	WB	5.1	(12)1.2E	A	AB	A	0321
1315-00-028-4860	CTG, 105MM, HE, M1		2	WB	5.1	(12)1.2E	A	AB	A	0321
1315-00-028-4954	CTG, IGNITION, M3		500	WB	.0171	1.4G	C	BW	C	0325
1315-00-028-4964	CTG, 81MM, ILL, M301	(E)	3	WB	1.6	(08)1.2G	A	AD	A	0171
1315-00-028-5033	CTG, 105MM, BLANK, M395		10	WB	1.70	1.3C	B	AI	B	0327
1315-00-028-5036	CTG, 105MM, BLANK, M395		2	WB	1.70	1.3C	B	AI	B	0327
1315-00-068-8472	CTG, 90MM, HEAT, M371E1		2	WB	1.8	(12)1.2E	A	AB	A	0321
1315-00-106-8548	CTG, 105MM, M1, HE		2	WB	4.70	(12)1.2E	A	AB	A	0321
1315-00-113-5912	CTG, 105MM, HE, M1		39	WB	4.70	(12)1.2E	A	AB	A	0321
1315-00-134-8984	CTG, 81MM, HE, M374A2		3	WB	2.10	(08)1.2E	A	AB	A	0321
1315-00-143-7048	CTG, 81MM, ILL, M301A3	(E)	3	WB	1.7	(08)1.2G	A	AD	A	0171
1315-00-143-7122	CTG, 81MM, ILL, M301A2	(E)	3	WB	1.6	(08)1.2G	A	AD	A	0171
1315-00-157-0796	CTG, 105MM, WP, M60A2	(C)	39	WB	7.1	(12)1.2H	A	AG	A	0245
1315-00-439-6122	CTG, 105MM, M60E1, SMK, WP	(C)	2	WB	7.1	(12)1.2H	A	AG	A	0245
1315-00-498-6406	CTG, 81MM, M375, WP	(C)	3	WB	2.0	1.3H	B	AE	B	0246
1315-00-498-6407	CTG., 81MM, HE, M374		3	WB	2.1	(08)1.2E	A	AB	A	0321
1315-00-555-4274	CTG, IGNITION, M3		500	WB	.0171	1.4G	C	BW	C	0325
1315-00-563-7067	CTG, 81MM, M374A3		3	WB	2.10	(08)1.2E	A	AB	A	0321
1315-00-574-7680	CTG, 81MM, WP, M375A3		3	WB	2.0	1.3H	B	AE	B	0246
1315-00-602-5177	CTG, 81MM, HE, M362		3	WB	2.10	(08)1.2E	A	AB	A	0321
1315-00-889-2019	CTG, 90MM, PRAC, M371		4	WB	1.4	(08)1.2E	A	AB	A	0321
1315-00-892-4307	CTG, 90MM, HEAT, M371		2	WB	1.8	(12)1.2E	A	AB	A	0321
1315-00-892-4895	CTG, 105MM, M60, SMK, WP	(C)	2	WB	7.084	(12)1.2H	A	AG	A	0245
1315-00-892-4951	CTG, 75MM, BLANK, M337A1E1		15	WB	1.0	1.3C	B	AI	B	0327
1315-00-926-4081	CTG, 105MM, HE, M1		2	WB	5.1	(12)1.2E	A	AB	A	0321
1315-00-926-9243	CTG, 90MM, CANISTER, XM590E1		6	WB	1.6	(08)1.2C	B	AH	B	0328

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1315-00-935-1992	CTG, 81MM, TP, M43A1		4	WB	.1838	(08)1.2E	A	AB	A	0321
1315-00-935-6003	CTG, 81MM, M375, SMK, WP	(C)	3	WB	2.0	(12)1.2H	A	AG	A	0245
1315-00-935-6008	CTG, 81MM, M374		3	WB	2.10	(08)1.2E	A	AB	A	0321
1315-00-935-6030	CTG, 81MM, M374		3	WB	2.10	(08)1.2E	A	AB	A	0321
1315-00-935-6032	CTG, 81MM, HE, M374		3	WB	2.10	(08)1.2E	A	AB	A	0321
1315-00-935-6033	CTG, 81MM, M374		3	WB	2.10	(08)1.2E	A	AB	A	0321
1315-01-073-9920	CTG, 105, CLEARING		2	MB	2.9	1.3C	B	AI	B	0327
1315-01-360-4896	CTG, 105MM, HE, M1		39	WB	4.7	(12)1.2E	A	AB	A	0321
1325-00-006-2082	DISP & BOMB, MK20 MOD 4		1	MB	100.0	1.1D	A	BF	A	0034
1325-00-009-3729	FUZE, BOMB, MK339 MOD 1		9	MB	.0006	1.4D	C	BB	C	0410
1325-00-009-4260	FUZE, BOMB, FMU-107/B		15	WB	.0027	(04)1.2D	C	DK	C	0409
1325-00-009-9565	CABLE ASSY		1	FB	.0008	1.4S	X	XX	OO	0349
1325-00-009-9598	CONTROL, GUIDED BOMB		1	FB	.9610	1.4S	C	EA	C	0323
1325-00-025-3277	IGNITER, BOMB, AN-M23A1, WP	(C)	24	WB	1.3	1.3H	FS	DZ	FS	0244
1325-00-025-9358	BOMB, G.P., MK84		2	PL	945.0	1.1D	A	BF	A	0034
1325-00-028-5264	BOMB, G.P., M117		2	PL	386.0	1.1D	A	BF	A	0034
1325-00-028-5273	BOMB, G.P., M118		1	PL	1917	1.1D	A	BF	A	0034
1325-00-028-5401	ADAPTER BOOSTER, T45		8	WB	0.4328	1.1D	A	AP	A	0042
1325-00-028-5461	FUZE, BOMB, M152A1		15	WB	.0027	1.1D	A	AZ	A	0408
1325-00-028-5465	FUZE, MECH TIME, M147A1		15	WB	.0027	1.4D	C	DK	C	0410
1325-00-028-5494	FUZE, BOMB, M158		30	WB	.0360	1.1D	A	AZ	A	0408
1325-00-038-4596	BOMB, G.P., MK83		3	PL	445.0	1.1D	A	BF	A	0034
1325-00-038-4638	CTG, SIGNAL	(E)	500	WB	.0602	1.4G	C	DC	OO	0312
1325-00-087-6404	DISP & BOMB, CBU-12A/A	(C)	1	MB	234.3	(04)1.2H	A	BF2	A	0245
1325-00-087-6423	DISP & BOMB, CBU-24B/B		1	MB	123.0	(12)1.2D	A	BF	A	0035
1325-00-092-9848	BOMB, G.P., MK81		12	PL	100.0	1.1D	A	BF	A	0034
1325-00-095-5739	BOMB, G.P., MK81		12	PL	100.0	1.1D	A	BF	A	0034
1325-00-106-7724	FUZE, BOMB, FMU-56C/B		10	WB	.0008	1.4D	C	BB	C	0410
1325-00-107-2233	CONTROL, GROUP, MAU-157A/B		4	MB	.9610	1.4S	C	EA	C	0323
1325-00-109-9381	DISP & BOMB, CBU-24B/B		2	WC	123.0	(12)1.2D	A	BF	A	0035
1325-00-109-9390	DISP & BOMB, CBU-49B/B		2	WC	123.0	(12)1.2D	A	BF	A	0035
1325-00-111-8024	FUZE, EXTENSION, KIT, M1A1		10	WB	2.0	1.1D	A	AQ	A	0043
1325-00-115-9784	FUZE, BOMB, FMU-54/B		15	WB	.3431	(04)1.2D	A	AZ	A	0409
1325-00-117-7328	BOMB, CHEM, BLU-52B/B, CS-2	(B)	1	WB	250.0	6.1G	IRR	YH	IR	2017
1325-00-133-9266	DISP & BOMB, MK20 MOD 2		1	MB	100.0	1.1D	A	BF	A	0034
1325-00-134-8356	DISP & BOMB, CBU-52B/B		2	MB	146.0	(04)1.2D	A	BF	A	0035
1325-00-134-8357	DISP & BOMB, CBU-52B/B		2	MB	146.0	(04)1.2D	A	BF	A	0035
1325-00-134-8358	DISP & BOMB, ACFT, CBU-52B/B		2	MB	146.0	(04)1.2D	A	BF	A	0035
1325-00-136-0380	FUZE, BOMB, FMU-26B/B		6	WB	.0007	1.4D	C	BB	C	0410
1325-00-142-0648	BOMB, SMK, AN-M47A4, WP	(C)	1	WB	74.0	1.3H	FS	DZ	FS	0244
1325-00-143-6981	BOMB, G.P., M117 TRITONAL		2	PL	382.0	1.1D	A	BF	A	0034

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1325-00-143-7092	DISP & BOMB, CBU-24B/B		2	MB	123.0	(12)1.2D	A	BF	A	0035
1325-00-143-7153	FUZE, BOMB, M904E3		30	WB	.1640	1.1D	A	AZ	A	0408
1325-00-143-8796	DISP & BOMB, CBU-25B/A		2	MB	35.0	(04)1.2D	A	BF	A	0035
1325-00-147-5387	DISP & BOMB, ACFT, CUB-58(T-1)/B		2	MB	.1400	1.4S	C	BB	C	0367
1325-00-148-4085	FUZE, BOMB, FMU-54A/B		15	WB	.3600	(04)1.2D	A	AZ	A	0409
1325-00-151-6377	CONTROL MODULE, GBU-8/B		1	MB	.0145	2.2S	NCG	XB	*NG	1066
1325-00-153-9323	FUZE, BOMB, FMU-72B		12	WB	.0007	1.4D	C	BB	C	0410
1325-00-160-2794	DISP & BOMB, CBU-70/B		2	MB	99.3	(12)1.2D	A	BF	A	0035
1325-00-160-2795	DISP & BOMB, CBU-38		1	MB	.1800	1.4S	X	XX	OO	0349
1325-00-160-4443	DISP & BOMB, CBU-71/B		2	WC	158.0	(04)1.2D	A	BF	A	0035
1325-00-160-4444	DISP & BOMB, CBU-71(T-1)/B		2	WC	.1400	1.4S	C	BB	C	0367
1325-00-163-3124	FUZE, ELECTRONIC, ASSY		1	MC	.0008	1.4D	C	BB	C	0410
1325-00-165-4554	DISP & BOMB, CBU-52B(T-1)/B		2	WC	.1400	1.4S	C	BB	C	0367
1325-00-166-2141	FUZE, BOMB, M909		12	WB	.0150	1.4D	C	BB	C	0410
1325-00-168-5778	BOMB, CLUSTER, INC, M36E2	(DE)	2	PL	111.5	1.3G	B	DH	B	0010
1325-00-168-5971	FUZE, PROXIMITY, FMU-56B/B		10	WB	.0008	1.4D	C	BB	C	0410
1325-00-169-0472	DISP & BOMB, CBU-7A(T-1)/A		1	MB	.1800	1.4S	X	XX	OO	0349
1325-00-172-7546	DISP & BOMB, CBU-38A/A		1	MB	183.0	1.1D	A	BF	A	0034
1325-00-176-2125	BOMB, BLU-82/B		1	PL	12,600	1.1D	A	BF	A	0034
1325-00-176-2127	BOOSTER, AUX. BOMB		30	WB	1.0	1.1D	A	AP	A	0042
1325-00-181-4421	DISP & BOMB, CBU-30(T-1)/B		1	MB	.1800	1.4S	X	XX	OO	0349
1325-00-182-3108	DISP & BOMB, CBU-25B/A		1	MC	35.0	(04)1.2D	A	BF	A	0035
1325-00-182-3109	DISP & BOMB, CBU-7A/A		1	MB	58.0	(12)1.2D	A	BF	A	0035
1325-00-182-3300	DISP & BOMB, CBU-58(T-1)/B		2	MB	.1400	1.4S	C	BB	C	0367
1325-00-182-3301	DISP & BOMB, CBU-58(T-1)/B		2	WC	.1400	1.4S	C	BB	C	0367
1325-00-182-3328	DISP & BOMB, CBU-58/B		2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-00-187-1348	CONTROL, GUIDED BOMB		1	FB	.9610	1.4S	C	EA	C	0323
1325-00-193-3186	DISP & BOMB, CBU-58/B		2	WC	158.0	(04)1.2D	A	BF	A	0035
1325-00-195-2677	GUIDE KIT, BOMB		2	MB	.1898	2.2S	NCG	XB	*NG	1066
1325-00-209-3655	DISP & BOMB, CBU-71/B		2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-00-209-6251	DETENT ASSY		325	WB	.0003	1.4B	C	BJ	C	0257
1325-00-219-8586	BURSTER, AN/M20		15	WB	.5331	1.1D	A	AQ	A	0043
1325-00-219-8676	FUZE, AN-M159		30	WB	.0371	(04)1.2D	C	BB	C	0409
1325-00-236-6912	CONTROL MODULE, GBU-8/B		1	MB	.0145	2.2S	NCG	XB	*NG	1066
1325-00-239-5935	BOMB, G.P., M117		2	PL	382.0	1.1D	A	BF	A	0034
1325-00-241-1591	CONTROL MODULE, GBU-8/B		1	MB	.0145	2.2S	NCG	XB	*NG	1066
1325-00-245-7964	CHG, SPOTTING, CXU-2/B	(B)	36	WB	.1036	1.4G	C	DG5	C	0197
1325-00-245-7966	CHG, SPOTTING, CXU-1/B	(B)	72	WB	.0989	1.4G	C	DG5	C	0197
1325-00-245-7976	DISP & BOMB		1	MB	117.7	(12)1.2D	A	BF	A	0035
1325-00-253-5431	PARTS KIT		*	*	.2651	1.4S	C	CF	C	0349
1325-00-255-6306	DISP & BOMB, MK20 MOD 3 (T-1)		1	MB	.0615	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1325-00-255-6307	DISP & BOMB, MK20 MOD 3	1	MB	100.0	1.1D	A	BF	A	0034
1325-00-294-4152	BOMB, G.P., MK82	6	PL	192.0	1.1D	A	BF	A	0034
1325-00-303-4668	DISP & BOMB CBU-52B/B	1	MB	146.0	(04)1.2D	A	BF	A	0035
1325-00-313-4871	COMPUTER GROUP, MAU-157B/B	4	MB	.9610	1.4S	C	EA	C	0323
1325-00-315-0390	DISP & BOMB, CBU-38C/A	1	MB	174.0	1.1D	A	BF	A	0034
1325-00-344-2370	ADAPTER BOOSTER	6	WB	.8800	1.1D	A	AP	A	0042
1325-00-350-0812	MANIFOLD, GUIDED BOMB	1	WB	.9602	1.4B	C	EA	C	0350
1325-00-386-2432	FUZE, PROXIMITY, FMU-56D/B	10	WB	.0008	1.4D	C	BB	C	0410
1325-00-386-2434	ADU-449/B ADPT KIT-FUZE TO DISP	10	WB	.0083	1.4C	C	EA	C	0276
1325-00-400-9171	ACTUATOR GUIDED BOMB	1	MB	.0075	2.2S	NCG	XB	*NG	1066
1325-00-406-2776	DISP & BOMB, CBU-38(T-2)/A	1	MB	.1700	1.4S	X	XX	OO	0349
1325-00-406-8225	DISP & BOMB, CBU-38/A	1	MB	183.0	1.1D	A	BF	A	0034
1325-00-408-7466	MODIFICATION KIT, MK75 MOD 2	1	MC	.5930	1.1D	A	AP	A	0042
1325-00-409-1726	BOMB, G.P., MK82	6	PL	192.0	1.1D	A	BF	A	0034
1325-00-419-6777	CUTTER & CONT ASSY	1	MB	.0075	2.2S	NCG	XB	*NG	1066
1325-00-448-8867	BOMB, FRAG	6	WB	4.6	1.1D	A	BF	A	0034
1325-00-450-0696	COMPUTER GROUP	4	MB	.9610	1.4S	C	EA	C	0323
1325-00-451-6958	FUZE, BOMB, FMU-81	12	WB	.0007	1.4D	C	BB	C	0410
1325-00-453-9878	MANIFOLD, GUIDED BOMB	1	WB	.9602	1.4B	C	EA	C	0350
1325-00-453-9903	CONTROL, GUIDED BOMB	1	MB	.9610	1.4S	C	EA	C	0323
1325-00-454-0028	CABLE, ASSY	1	FB	.0008	1.4S	X	XX	OO	0349
1325-00-458-5179	BOOSTER FUZE	200	WB	.0100	1.3C	B	CK	B	0275
1325-00-460-1305	BOMB, G.P., MK82	6	PL	192.0	1.1D	A	BF	A	0034
1325-00-464-7369	BOMB, G.P., MK83	3	PL	445.0	1.1D	A	BF	A	0034
1325-00-467-0952	ADAPTER, DISP, ADU-373A/B	1	MC	.0008	1.4S	X	XX	OO	0349
1325-00-471-1199	INITIATOR, FMU-7C/B	14	WB	.0016	1.4S	X	XX	OO	0349
1325-00-471-4158	FUZE, BOMB, FMU-7C/B	14	WB	.0022	(04)1.2D	C	BB	C	0409
1325-00-477-2053	DISP & BOMB, CBU-52B/B	2	WC	146.0	(04)1.2D	A	BF	A	0035
1325-00-477-2058	DISP & BOMB, CBU-58/B	2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-00-477-2059	DISP & BOMB, CBU-58/B	2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-00-477-3758	CMPTR CONTROL GROUP, MAU-169/B	4	MB	.9610	1.4S	C	EA	C	0323
1325-00-478-8965	DISP & BOMB, CBU-14A(T-2)/A	2	MB	.1500	1.4S	X	XX	OO	0349
1325-00-478-8966	DISP & BOMB, CBU-14A(T-1)/A	2	MB	.1500	1.4S	X	XX	OO	0349
1325-00-483-3036	BOMB, CHEM, BLU-27B/B (D)	1	WC	717.0	1.3J	FL	BN	*FL	0247
1325-00-486-6249	LEAD EXPL	N/A	N/A	.0001	1.1D	A	BT	A	0065
1325-00-489-1575	COMPUTER, BOMB	1	FB	.0016	****1.4S	X	XX	OO	0349
1325-00-489-1576	CONTROL, GUIDED BOMB	1	FB	.9610	1.4S	C	EA	C	0323
1325-00-489-1577	CABLE & BATTERY, ASSY	1	FB	.0008	1.4S	X	XX	OO	0349
1325-00-491-6140	DISP & BOMB, MK20 MOD 4 (T-2)	1	MB	.0639	1.4S	X	XX	OO	0349
1325-00-495-5413	ADAPTER BOOSTER, M148	30	WB	.3900	1.1D	A	AP	A	0042
1325-00-529-7684	EXTENSION, FUZE, BOMB, M1	10	WB	1.0	1.1D	A	AQ	A	0043

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1325-00-540-7629	BOMB, G.P., MK82	6	PL	192.0	1.1D	A	BF	A	0034
1325-00-541-0190	BOMB, G.P., MK84	2	PL	945.0	1.1D	A	BF	A	0034
1325-00-553-4790	DISP & BOMB, CBU-75A/B	2	MB	419.8	(12)1.2D	A	BF	A	0035
1325-00-554-1173	BOMB, GAS, MC-1, GB (A)	2	PL		6.1K	PA	XY6	PG	2016
1325-00-554-1431	CHG, SPOTTING	10	WB	6.0	1.1D	A	BF3	A	0027
1325-00-570-2498	FUZE, BOMB, FMU-7A/B	14	WB	.0022	(04)1.2D	C	BB	C	0409
1325-00-570-2528	INITIATOR, FMU-7A/B	14	WB	.0016	1.4S	X	XX	OO	0349
1325-00-585-9057	FUZE, BOMB, M905	30	WB	.0150	(04)1.2D	C	CF	C	0409
1325-00-585-9287	DELAY ELEMENT, FUZE, M9	240	WB	.0002	1.4S	C	DK	C	0367
1325-00-585-9288	DELAY ELEMENT, FUZE, M9	240	WB	.0002	1.4S	C	DK	C	0367
1325-00-585-9289	DELAY ELEMENT, FUZE, M9	240	WB	.0002	1.4S	C	DK	C	0367
1325-00-585-9290	DELAY ELEMENT, FUZE, M9	240	WB	.0002	1.4S	C	DK	C	0367
1325-00-585-9579	DELAY ELEMENT, FUZE, M9	240	WB	.0002	1.4S	C	DK	C	0367
1325-00-585-9580	DELAY ELEMENT, FUZE, M9	240	WB	.0002	1.4S	C	DK	C	0367
1325-00-596-9999	BOMB, G.P., MK81	12	PL	100.0	1.1D	A	BF	A	0034
1325-00-603-9814	FUZE, BOMB	10	WB	.0008	1.4D	C	BB	C	0410
1325-00-613-0484	FUZE, FMU-54A/B	12	WB	.3600	(04)1.2D	A	AZ	A	0409
1325-00-623-6379	ADAPTER BOOSTER	20	WB	.0130	1.1D	A	AP	A	0042
1325-00-710-6765	BOMB, G.P., MK84	2	PL	945.0	1.1D	A	BF	A	0034
1325-00-710-6768	BOMB, G.P., MK82	6	PL	192.0	1.1D	A	BF	A	0034
1325-00-710-6771	BOMB, G.P., MK81	12	PL	100.0	1.1D	A	BF	A	0034
1325-00-716-1443	BURSTER, BOMB, M32	3	WB	15.0	1.1D	A	AQ	A	0043
1325-00-726-2976	DISP & BOMB, CBU-38B/A	1	MB	183.0	1.1D	A	BF	A	0034
1325-00-729-4384	FUZE, BOMB, M907	12	WB	.0150	(04)1.2D	C	BB	C	0409
1325-00-756-2183	FUZE, BOMB, M904	30	WB	.1650	1.1D	A	AZ	A	0408
1325-00-756-2184	FUZE, BOMB, M905	15	WB	.0150	(04)1.2D	C	CF	C	0409
1325-00-781-9624	DISP & BOMB, CBU-46/A	1	MB	117.7	(12)1.2D	A	BF	A	0035
1325-00-781-9986	BOMB, CHEM, BLU-52A/B, CS-2 (B)	1	WB	250.0	1.4G	IRR	YH	*IR	0301
1325-00-805-9281	CTG, EJECTION	96	MC	.0003	1.4S	C	DC	00	0012
1325-00-809-1476	DISP & BOMB	1	WC	117.0	(12)1.2D	A	BF	A	0035
1325-00-809-2568	DISP & BOMB, CBU-49B/A	1	MB	123.0	(12)1.2D	A	BF	A	0035
1325-00-809-2569	DISP & BOMB, CBU-49C/B	1	MB	117.0	(12)1.2D	A	BF	A	0035
1325-00-809-2680	FUZE, BOMB	6	WB	.0007	1.4D	C	BB	C	0410
1325-00-827-3851	ADAPTER BOOSTER, M148	12	WB	.3900	1.1D	A	AP	A	0042
1325-00-827-4020	FUZE, BOMB, M905	30	WB	.0150	(04)1.2D	C	CF	C	0409
1325-00-827-4029	FUZE, BOMB, M904E2	30	WB	.1650	1.1D	A	AZ	A	0408
1325-00-832-8310	FUZE, BOMB	28	WB	.0022	(04)1.2D	C	BB	C	0409
1325-00-871-4695	INITIATOR ASSY, BOMB, FMU-7B	14	WB	.0016	1.4S	X	XX	OO	0349
1325-00-871-4697	FUZE ASSY, BOMB, FMU-7B	14	WB	.0022	(04)1.2D	C	BB	C	0409
1325-00-879-2644	FUZE, BOMB, FMU-26A/B	6	WB	.0007	1.4D	C	BB	C	0410
1325-00-879-2645	BOOSTER, FUZE, FZU-1/B	200	WB	.0100	1.3C	B	CK	B	0275

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1325-00-879-3993	DISP & BOMB, CBU-30/A, CS	(B)	1	MB	110.0	1.3G	IRR	DX	*IR	0019
1325-00-883-5310	DISP & BOMB, CBU-38(T-1)/A		1	MB	.1800	1.4S	X	XX	OO	0349
1325-00-883-5312	DISP & BOMB, CBU-38A(T-2)/A		1	MB	.1700	1.4S	X	XX	OO	0349
1325-00-891-5439	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	C	DK	C	0367
1325-00-891-5440	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	C	DK	C	0367
1325-00-891-5441	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	C	DK	C	0367
1325-00-891-5442	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	C	DK	C	0367
1325-00-891-5443	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	C	DK	C	0367
1325-00-891-5444	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	C	DK	C	0367
1325-00-894-0230	CTG, ASSY		100	FB	.0003	1.4S	C	EA	C	0323
1325-00-895-3874	DISP & BOMB, CBU-25A/A		1	MB	35.0	(04)1.2D	A	BF	A	0035
1325-00-900-5542	TANK, SPRAY, LIQUID, AGENT	(A)	1	MB		6.1K	PA	XY7	PG	2016
1325-00-900-8590	DISP & BOMB, CBU-12/A, WP	(C)	1	MB	234.3	(04)1.2H	A	BF2	A	0245
1325-00-900-8591	BOMB, BLU-17/B, WP	(C)	N/A	N/A	1.105	(04)1.2D	A	BF	A	0245
1325-00-904-9383	BOMB, BLU-24/B		N/A	N/A	.26	(12)1.2D	A	BF	A	0035
1325-00-912-4052	DISP & BOMB, CBU-22/A	(C)	2	MB	79.2	(04)1.2H	A	BF2	A	0245
1325-00-925-4444	DISP & BOMB, CBU-14A/A		2	MB	40.3	(12)1.2D	A	BF	A	0035
1325-00-926-1856	ADAPTER BOOSTER, T45E4		8	WB	.3900	1.1D	A	AP	A	0042
1325-00-926-1868	BOMB, G.P., M117		2	PL	386.0	1.1D	A	BF	A	0034
1325-00-926-1895	FUZE, BOMB, M904		30	WB	.1650	1.1D	A	AZ	A	0408
1325-00-926-3954	ADAPTER BOOSTER, M148		8	WB	.3900	1.1D	A	AP	A	0042
1325-00-926-3988	ADAPTER BOOSTER		8	WB	.4400	1.1D	A	AP	A	0042
1325-00-926-4010	BOMB, CLUSTER, FRAG, M1A4		1	MB	16.2	(12)1.1D	A	BF	A	0034
1325-00-926-4082	ADAPTER BOOSTER		30	WB	.8800	1.1D	A	AP	A	0042
1325-00-926-4084	ADAPTER BOOSTER		6	WB	.8800	1.1D	A	AP	A	0042
1325-00-926-9321	DISP & BOMB, CBU-14A/A		2	MB	40.3	(12)1.2D	A	BF	A	0035
1325-00-926-9356	INITIATOR		14	WB	.0016	1.4S	X	XX	OO	0349
1325-00-926-9401	FUZE, BOMB, M907E2		12	WB	.0150	(04)1.2D	C	BB	C	0409
1325-00-926-9402	FUZE, BOMB, M907E2		12	MB	.0150	(04)1.2D	C	BB	C	0409
1325-00-933-4954	DISP & BOMB, CBU-25A/A		2	MB	35.0	(04)1.2D	A	BF	A	0035
1325-00-935-2070	ADAPTER BOOSTER, M147		30	WB	.8800	1.1D	A	AP	A	0042
1325-00-935-6039	BOMB, CHEM, BLU-52/B, CS-1	(B)	1	WC	250.0	1.4G	IRR	YH	*IR	0301
1325-00-935-6085	ADAPTER BOOSTER, M147		6	WB	.8800	1.1D	A	AP	A	0042
1325-00-935-6137	EXTENSION, FUZE, BOMB, M1A1		10	WB	2.0	1.1D	A	AQ	A	0043
1325-00-935-9135	BOMB, G.P., M118		1	PL	1893	1.1D	A	BF	A	0034
1325-00-935-9174	BOMB, G.P., MK82		6	PL	192.0	1.1D	A	BF	A	0034
1325-00-935-9184	DISP & BOMB, CBU-49B/B		1	WC	123.0	(12)1.2D	A	BF	A	0035
1325-00-935-9217	BOMB, G.P., M117		2	PL	386.0	1.1D	A	BF	A	0034
1325-00-937-2139	BOMB, G.P., MK84		2	PL	945.0	1.1D	A	BF	A	0034
1325-00-938-1937	TGT, DETECTING DEVICE		5	MC	N/A	1.4S	X	XX	OO	0349
1325-00-938-6984	FUZE, BOMB, FMU-54/B		15	WB	.3430	1.4D	C	BB	C	0410

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	DOD HAZARD CLASS DOT CODES MKG 8	DOD HAZARD CLASS DOT CODES LAB 9	DOD HAZARD CLASS DOT CODES SER 10
1325-00-947-7617	BOOSTER & TAPER ASSY	100	WB	.0992	1.1D	A	AP	A	0042
1325-00-949-5421	DISP & BOMB, CBU-22A/A, WP (C)	2	MB	79.2	(04)1.2H	A	BF2	A	0245
1325-00-965-6855	FUZE, BOMB, M904E2	30	WB	.1650	1.1D	A	AZ	A	0408
1325-01-006-0059	CBU-MK20 MOD 3	2	MB	100.0	1.1D	A	BF	A	0034
1325-01-009-0462	CUTTER ASSY	*	*	.0145	1.4S	C	BG	C	0070
1325-01-012-1989	FUZE, FMU-110/B	2	MB	.0120	1.4D	C	BB	C	0410
1325-01-012-1990	FUZE, FMU-113/B	2	MB	.0020	1.4S	X	XX	OO	0349
1325-01-033-9895	BOMB, G.P., MK84	2	PL	945.0	1.1D	A	BF	A	0034
1325-01-034-6017	DISP & BOMB, CBU-75B/B	2	MB	419.75	(12)1.2D	A	BF	A	0035
1325-01-038-4733	DISP & BOMB, CBU-58A/B	2	MB	148	(04)1.2D	A	BF	A	0035
1325-01-038-4734	DISP & BOMB, CBU-71A/B	2	MB	148	(04)1.2D	A	BF	A	0035
1325-01-041-2291	CONT GUIDED BOMB	1	FB	.9610	1.4C	C	EA	C	0276
1325-01-042-7928	MANIFOLD ASSY	1	*	.9602	1.4C	C	EA	C	0276
1325-01-042-7929	CABLE & BATTERY	1	*	.0008	1.4S	X	XX	OO	0349
1325-01-042-9735	DET ELEC, M36A1	1	N/A	.0007	1.1B	A	FA	A	0073
1325-01-055-0358	ADAPTER KIT, ADU-449/B	20	WB	.0083	1.4C	C	EA	C	0276
1325-01-056-0824	FUZE, MK339 MOD 1	1	FB	.0006	1.4D	C	BB	C	0410
1325-01-061-4192	FUZE, FMU-124A/B	1	MC	.2712	1.4D	C	BB	C	0410
1325-01-064-0853	BOMB, G.P., MK82	6	PL	192	1.1D	A	BF	A	0034
1325-01-066-7965	COMPUTER CONT GP, MAU-169A/B	4	MB	.9610	1.4S	C	EA	C	0323
1325-01-079-6248	COMPUTER CONT GP, MAU-169B/B	4	MB	.9610	1.4S	C	EA	C	0323
1325-01-081-3377	CLUSTER, MK20 MOD 3	2	MB	100	1.1D	A	BF	A	0034
1325-01-081-3378	DISP & BOMB, CBU-MK20 MOD 3 (T-1)	2	MB	.0615	1.4S	X	XX	OO	0349
1325-01-085-6022	COMPUTER CONT GP, MAU-169C/B	4	MB	.9610	1.4S	C	EA	C	0323
1325-01-088-4217	CTG, SIGNAL, CXU-3 (B)	50	MB	.0830	1.4G	C	DG5	C	0197
1325-01-089-4525	COMPUTER GP, MAU-169A/B	1	MB	.9610	1.4S	C	EA	C	0323
1325-01-090-7482	CONT SEC, DCU-199A/B	1	FB	.9610	1.4C	C	EA	C	0276
1325-01-092-3195	COMPUTER GP, MAU-169B/B	1	MB	.9610	1.4S	C	EA	C	0323
1325-01-098-2812	COMPUTER GP, MAU-169D/B	1	MB	.9610	1.4S	C	EA	C	0323
1325-01-110-6320	COMMON CONT MODULE, WCU-6/B	1	MB	.0003	2.2S	NCG	XC	NG	1046
1325-01-112-8170	CTG, SIGNAL, CXU-3A/B (B)	50	MB	.0830	1.4G	C	DG5	C	0197
1325-01-123-3991	G&C SECTION WGU-12/B	1	MB	.5630	2.2S	NCG	XC	NG	1046
1325-01-128-7220	FUZE SYS, FMU-124A/B	2	MC	.2712	1.4D	C	BB	C	0410
1325-01-130-6711	FUZE, FMU-112/B	6	MC	.2778	(04)1.2D	A	AZ	A	0409
1325-01-137-5955	REGULATOR ASSY VESSEL	N/A	N/A	.0002	2.2S	NCG	XC	NG	1046
1325-01-137-5992	CONT UNIT ASSY, WCU-8/B	1	MB	.0006	2.2S	NCG	XC	NG	1046
1325-01-143-1137	BOOSTER, FZU-1/B	10	WB	.0100	1.3C	B	CK	B	0275
1325-01-156-3977	MK339 BOMB FUZE ADAPTER KIT/ M129E2 LEAFLET BOMB	N/A	N/A	.0001	1.4B	C	BB	C	0257
1325-01-196-4533	DISP & BOMB, CBU-87/B	2	MB	129.0	(14)1.1D	A	BF	A	0034
1325-01-199-5301	DISP & BOMB, CBU-87(T-1)/B	2	MB	.0816	1.4D	C	FC	C	0237

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1325-01-214-7311	FUZE, BOMB FMU-139A/B	6	MC	.2778	(04)1.2D	A	AZ	A	0409
1325-01-221-5385	BOMB, BLU-109/B	2	PL	535.0	1.1D	A	BF	A	0034
1325-01-222-4196	FUZE, FMU-143/B	1	MC	.2721	1.4D	C	BB	C	0410
1325-01-224-0813	FUZE SYSTEM, FMU-143/B	2	MC	.2721	1.4D	C	BB	C	0410
1325-01-236-8431	G&C SECTION WGU-10/B	1	MB	.0001	2.2S	NCG	XC	NG	1046
1325-01-237-8904	G&C SECTION WGU-25/B	1	MB	.5630	2.2S	NCG	XC	NG	1046
1325-01-257-9428	G&C SECTION WGU-12B/B	1	MB	.5630	2.2S	NCG	XC	NG	1046
1325-01-258-5463	COMPUTER GP, MAU-169F/B	1	MB	.9610	1.4S	C	EA	C	0323
1325-01-263-7678	DISP & BOMB, CBU-87A/B	2	MB	129.0	(14)1.1D	A	BF	A	0034

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1325-01-263-7679	DISP & BOMB, CBU-87B/B	2	MB	129.0	(14)1.1D	A	BF	A	0034
1325-01-267-7703	CONT UNIT ASSY, WCU-8A/B	1	MB	.0006	2.2S	NCG	XC	NG	1046
1325-01-269-8006	COMPUTER GP, MAU-169 E/B	1	MB	.9610	1.4S	C	EA	C	0323
1325-01-279-1618	TIMER ACTUATOR, DTU-31/B	8	MB	.0006	1.4S	X	XX	OO	0349
1325-01-280-8676	CONTROL UNIT ASSY, WCU-8/B	1	MB	.0006	2.2S	NCG	XC	NG	1046
1325-01-285-7504	BOMBLET, BLU-97A/B	20	MB	.6386	(04)1.2D	A	BF	A	0035
1325-01-290-7554	DISP & BOMB, CBU-58/B	1	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-291-4272	DISP & BOMB, CBU-71A/B	1	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-291-4273	DISP & BOMB, CBU-58A/B	1	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-292-5536	DISP & BOMB, CBU-71/B	2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-294-5226	DISP & BOMB, CBU-58A/B	1	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-294-5227	DISP & BOMB, CBU-52B/B	1	MB	146.0	(04)1.2D	A	BF	A	0035
1325-01-294-5228	DISP & BOMB, CBU-58/B	1	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-294-5229	DISP & BOMB, CBU-71A/B	1	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-303-9340	G&C SECTION WGU-33/B	1	MB	.0001	2.2S	NCG	XC	NG	1046
1325-01-304-0002	FUZE SYSTEM, FMU-124B/B	2	MC	.2712	1.4D	C	BB	C	0410
1325-01-305-0516	FUZE, FMU-124B/B	1	MC	.2712	1.4D	C	BB	C	0410
1325-01-306-7976	COMPUTER GP, MAU-169G/B	1	MB	.9610	1.4S	C	EA	C	0323
1325-01-316-1228	DISP & BOMB, CBU-71/B	1	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-323-9171	FUZE SYSTEM, FMU-143B/B	2	MB	.2721	1.4D	C	BB	C	0410
1325-01-327-7867	FUZE, FMU-124C/B	1	MC	.2712	1.4D	C	BB	C	0410
1325-01-328-1643	DISP & BOMB, CBU-87D/B	2	MB	129.0	(14)1.1D	A	BF	A	0034
1325-01-339-5632	DISP & BOMB, CBU-87C/B	2	MB	129.0	(14)1.1D	A	BF	A	0034
1325-01-342-9086	G&C SECTION, WGU-25A/B	1	MB	.5630	2.2S	NCG	XC	NG	1046
1325-01-343-1600	DISP & BOMB, CBU-52B/B	2	MB	146.0	(04)1.2D	A	BF	A	0035
1325-01-343-1601	DISP & BOMB, CBU-52B/B	2	MB	146.0	(04)1.2D	A	BF	A	0035
1325-01-343-1602	DISP & BOMB, CBU-58/B	2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-343-1603	DISP & BOMB, CBU-58/B	2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-343-1604	DISP & BOMB, CBU-58A/B	2	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-343-1605	DISP & BOMB, CBU-58A/B	2	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-343-1606	DISP & BOMB, CBU-71/B	2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-343-1607	DISP & BOMB, CBU-71/B	2	MB	158.0	(04)1.2D	A	BF	A	0035
1325-01-343-1608	DISP & BOMB, CBU-71A/B	2	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-343-1609	DISP & BOMB, CBU-71A/B	2	MB	148.0	(04)1.2D	A	BF	A	0035
1325-01-349-6258	FUZE, BOMB, FMU-139A/B	6	MC	.2778	(04)1.2D	A	AZ	A	0409
1325-01-356-1432	G&C SECTION, WGU-39/B	1	MB	.5630	2.2S	NCG	XC	NG	1046
1325-14-398-7137	BLU-107/B DURANDAL W/DD-2	3	MB	80.0	(06)1.2F	A	CR	A	0295
1325-14-407-2791	CUTTER,DD2	3	MB	.0200	1.4B	C	BB	C	0257
1330-00-028-5825	ADAPTER, GRENADE, PROJ, M1A2	48	WB	.0153	1.4S	C	DC	OO	0014

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5	6	CL 7	MKG 8	LAB 9	SER 10
1330-00-028-5830	ADAPTER, GRENADE, PROJ, M2A1	50	WB	.0153	1.4S	C	DC	OO	0014
1330-00-028-5835	GRENADE, HAND, PRAC, M21	25	WB	.0060	1.4G	C	DK	C	0452
1330-00-028-5837	GRENADE, HAND, MK2	25	WB	.1300	(04)1.1F	A	BS	A	0292
1330-00-028-5838	GRENADE, HAND, PRAC, M21	25	WB	.0060	1.4G	C	DK	C	0452
1330-00-028-5839	GRENADE, HAND, M26	30	WB	.3700	(04)1.1F	A	BS	A	0292
1330-00-028-5850	FUZE, GRENADE, PRAC, M10A3	200	WB	.0030	1.4G	C	DK	C	0317
1330-00-028-5851	FUZE, HAND GRENADE, M205	200	WB	.0030	1.4G	C	DK	C	0317
1330-00-028-5854	CHG, PRAC, HAND GRENADE	5000	WB	.0050	1.1D	A	AL	A	0028
1330-00-028-5855	CHG, PRAC, HAND GRENADE	4000	WB	.0050	1.1D	A	AL	A	0028
1330-00-028-5856	CHG, PRAC, HAND GRENADE	750	WB	.0050	1.1D	A	AL	A	0028
1330-00-028-5857	CHG, PRAC, HAND GRENADE	500	WB	.0050	1.1D	A	AL	A	0028
1330-00-028-5858	CHG, PRAC, HAND GRENADE	1250	WB	.0050	1.1D	A	AL	A	0028
1330-00-028-5860	GRENADE, RIFLE, WP, M19A1 (C)	10	WB	.5300	(04)1.2H	A	CP	A	0245
1330-00-028-5906	GRENADE, RIFLE, ILL, M27 (E)	10	WB	.5300	1.3G	B	DH	B	0254
1330-00-028-5908	GRENADE, RIFLE, SMK, RED, M22A2 (E)	10	WB	.4000	1.4G	C	XN	C	0303
1330-00-028-5915	GRENADE, RIFLE, SMK, RED STREAMER, M23A1 (E)	10	WB	.4400	1.4G	C	XN	C	0303
1330-00-028-5916	GRENADE, RIFLE (E)	10	WB	.4400	1.4G	C	XN	C	0303
1330-00-133-8244	GRENADE, M67	30	WB	.4100	(04)1.1F	A	BS	A	0292
1330-00-133-9275	GRENADE, PRAC, M69	50	WB	.0030	1.4S	C	DK	C	0110
1330-00-168-5502	FUZE, GRENADE, XM228	10	WB	.0030	1.4B	C	DK	C	0257
1330-00-219-8510	GRENADE, HAND SMK, M15, WP (C)	16	WB	.94	(04)1.2H	A	BS2	A	0245
1330-00-219-8511	GRENADE, HAND SMK, AN-M8, HC (DE)	16	WB	1.2	1.4G	C	XN	C	0303
1330-00-219-8557	GRENADE, AN-M14 (DE)	16	WB	1.7	1.3G	B	DH	B	0010
1330-00-219-8576	GRENADE, HAND, M7, CN (B)	16	WB	.6400	1.4G	IRR	DX	IR	0301
1330-00-219-8577	GRENADE, HAND, AN-M7A1, CN (B)	16	WB	.7800	1.4G	IRR	DX	*IR	0301
1330-00-219-8578	GRENADE, HAND, M25A1, CN-1 (B)	50	WB	.2000	1.4G	IRR	DX	*IR	0301
1330-00-289-6851	GRENADE, HAND, M18 (E)	16	WB	.7200	1.4G	C	XN	C	0303
1330-00-289-6852	GRENADE, HAND, M18 (E)	16	WB	.7200	1.4G	C	XN	C	0303
1330-00-289-6853	GRENADE, HAND, M18 (E)	16	WB	.7200	1.4G	C	XN	C	0303
1330-00-289-6854	GRENADE, HAND, M18 (E)	16	WB	.7200	1.4G	C	XN	C	0303
1330-00-541-9848	GRENADE, RIFLE, HEAT, M31	10	WB	.6200	1.1D	A	CP	A	0284
1330-00-585-9362	CHG, PRAC, HAND GRENADE	6000	WB	.0050	1.1D	A	AL	A	0028
1330-00-645-6211	GRENADE, HAND, M25A2, CS-1 (B)	50	WB	.1300	1.4G	IRR	DX	*IR	0301
1330-00-676-2671	GRENADE, HAND-RIFLE, M34, WP (C)	16	WB	.9400	(04)1.2H	A	BS2	A	0245
1330-00-682-4645	GRENADE, HAND, CN-1, ABC-M25A1 (B)	50	WB	.2000	1.4G	IRR	DX	IR	0301
1330-00-682-4646	GRENADE, HAND, DM-1, ABC-M25A2 (B)	50	WB	.1400	1.4G	IRR	DX	IR	0301
1330-00-764-8435	CTG, GRENADE, XM195	1080	WC	.0030	1.4S	C	DC	OO	0014
1330-00-799-8816	GRENADE, HAND CS, M7A2 (B)	16	WB	.5600	1.4G	IRR	DX	IR	0301
1330-00-926-1857	GRENADE, HAND, M26A1	30	WB	.3900	(04)1.1F	A	BS	A	0292
1330-00-926-4011	CTG, GRENADE, XM195	1080	WC	.0030	1.4S	C	DC	OO	0014

Table 3-1. Explosives Haz. Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1330-00-935-2030	CTG, GRENADE, M195	2280	WC	.0030	1.4S	C	DC	OO	0014
1330-00-935-6064	GRENADE, HAND, M61	30	WB	.3400	(04)1.1F	A	BS	A	0292
1330-00-935-6092	GRENADE, HAND, MK1 MOD2 (E)	24	WB	.2200	1.3G	B	DH	B	0254
1330-00-965-0802	GRENADE, HAND, M7A3, CS (B)	16	WB	.7500	1.4G	IRR	DX	*IR	0301
1330-00-969-6824	GRENADE, HAND, ILL, MK1 MOD 1 (E)	25	WB	.2200	1.3G	B	DH	B	0254
1336-00-001-1649	WARHEAD, MK5 MOD 1	1	MB	54.0	1.1D	A	BI	A	0286
1336-00-001-1650	WARHEAD, MK86 MOD 1	1	MB	50.0	1.1D	A	BI	A	0286
1336-00-008-5328	FUZE, MK330 MOD 2	*	*	.3647	1.1D	A	AZ	A	0408
1336-00-014-0509	WARHEAD, MK38 MOD 0	1	MB	20.0	1.1D	A	BI	A	0286
1336-00-022-9378	SWITCH, SQUIB ACT	1	MB	.0002	1.4S	X	XX	OO	0349
1336-00-043-5277	FUZE, GUIDED MSL, MK312 MOD 0	8	WB	.3700	1.1B	A	AZ	A	0106
1336-00-043-5278	FUZE, GUIDED MSL, MK312 MOD 2	8	WB	.3700	1.1D	A	AZ	A	0408
1336-00-051-3571	EXPL CHG, M1	1	MB	.0018	1.1D	C	XZ	C	0290
1336-00-051-7573	GEN ASSY	1	FB	.0043	1.4C	C	EA	C	0276
1336-00-054-5341	TANK AND PRIMER ASSY	1	MB	.0001	1.4S	C	XG	C	0323
1336-00-062-5085	S&A DEVICE, W/O BOOSTER, MK35 MOD 0	1	FB	.0017	1.4S	C	BB	C	0367
1336-00-067-0138	EXPL CHG, M1	1	MB	.0009	1.4B	C	BJ	C	0383
1336-00-067-0139	EXPL CHG, M1	1	FB	.0054	1.4B	C	BJ	C	0383
1336-00-070-2472	GEN, GAS PRESSURE	1	FB	.0037	1.4C	C	EA	C	0276
1336-00-070-2484	VAVLE	*	*	.0006	1.4S	X	XX	OO	0349
1336-00-071-4138	INITIATOR, ELECTRIC	1	MC	.0070	1.4S	C	BE	C	0454
1336-00-076-1005	EXPL CHG, M1	1	MB	.0023	1.1D	C	XZ	C	0290
1336-00-076-3185	S&A MECH	1	FB	.0166	1.4B	C	BB	C	0257
1336-00-076-3186	BOOSTER, DELAY, SKIRT	1	FB	.0166	1.4G	C	BW	C	0325
1336-00-076-3188	BOOSTER, DELAY, SKIRT	1	FB	.0068	1.4G	C	BW	C	0325
1336-00-076-3189	S&A MECH	1	MB	.0003	1.4B	C	BB	C	0257
1336-00-076-4687	EXPL CHG, M1	1	MB	.0026	1.1D	C	XZ	C	0290
1336-00-076-4688	DETONATOR ASSY	1	FB	.0010	1.1B	C	BB	C	0030
1336-00-076-4715	EXPL CHG, M1	1	MB	.0030	1.1D	C	XZ	C	0290
1336-00-076-6180	BOOSTER, SKIRT REMOVAL	1	FB	.0014	1.4B	C	BB	C	0257
1336-00-077-0062	S&A DEVICE	1	MB	.0004	1.4B	C	BB	C	0257
1336-00-077-0065	S&A DEVICE	1	MB	.0023	1.4B	C	BB	C	0257
1336-00-078-6349	VALVE	1	MB	.0005	1.4S	X	XX	OO	0349
1336-00-079-3978	TANK & PRIMER ASSY	1	FB	.0002	1.4S	C	XG	C	0323
1336-00-092-8473	WARHEAD, MK85 MOD 1	1	MB	.3647	(04)1.2B	C	BB	C	0107
1336-00-104-0184	WARHEAD	1	MB	180.0	(12)1.2D	A	BI	A	0287
1336-00-106-6808	GEN, GAS PRESSURE	1	MC	4.6	1.3C	B	EM	B	0186
1336-00-106-6809	GEN, GAS PRESSURE	1	MC	2.5	1.3C	B	EM	B	0186
1336-00-126-6002	FUZE & TIMER ASSY	1	MB	.0008	1.4G	C	XT	C	0317
1336-00-126-6003	CABLE ASSY	1	MB	.0008	1.4S	C	BE	C	0454

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1336-00-127-4043	CABLE ASSY	1	MB	.0006	1.4S	C	BE	C	0454
1336-00-130-9251	WARHEAD	1	MB	370.7	1.1D	A	BI	A	0286
1336-00-133-5015	DET ASSY	1	FB	.0010	1.1B	C	BB	C	0030
1336-00-135-2872	WARHEAD, MK5 MOD 0	1	MB	54.0	1.1D	A	BI	A	0286
1336-00-136-6435	FUZE, DELAY	*	MB	.0125	1.4G	C	XT	C	0103
1336-00-152-3304	FUZE, GUIDED MSL, MK303 MOD 2	1	MB	.0771	1.1D	A	AZ	A	0408
1336-00-160-2797	FUZE, CM	1	MB	.2482	1.4G	C	XT	C	0103
1336-00-163-3121	SQUIB, ELEC	1	FB	.0001	1.4S	C	BE	C	0454
1336-00-236-4782	SQUIB, ELEC	100	FB	.0002	1.4S	C	BE	C	0454
1336-00-239-2262	EXPL CHG	1	FB	.0006	1.4B	C	BJ	C	0257
1336-00-239-2264	S&A MECH	1	MB	.0003	1.4B	C	BB	C	0257
1336-00-262-4156	EXPL BOLT ASSY	1	MB	.0010	1.4S	C	BJ	C	0173
1336-00-299-1491	CYL, SQUIB, ACT	1	FB	.0003	2.2S	NCG	XC	*NG	1046
1336-00-341-5810	WARHEAD, MK2 MOD 2	1	MB	2.6	1.1D	A	BI	A	0286
1336-00-344-4485	WARHEAD	1	MB	179.0	(12)1.2D	A	BI	A	0287
1336-00-350-9419	WARHEAD, MK48 MOD 5	2	MB	10.5	1.1D	A	BI	A	0168
1336-00-397-4220	GEN GAS, MK6	12	MB	.0360	1.4C	C	EA	C	0276
1336-00-400-1038	FUZE, INFLUENCE	1	MB	.0772	1.4S	X	XX	OO	0349
1336-00-400-4147	TIMER ASSY	1	MB	.0001	1.4S	X	XX	OO	0349
1336-00-403-0499	SQUIB, ELEC	1	FB	.0068	1.4S	C	EA	C	0323
1336-00-406-2765	FUZE, GUIDED MSL	1	MB	.1323	(04)1.2D	C	BB	C	0409
1336-00-406-9960	EXPL TRANSFER ASSY	1	MB	.1300	(04)1.2B	A	AZ	A	0107
1336-00-406-9961	CMD DEST, S&A	1	FB	.0009	1.4S	C	BB	C	0367
1336-00-406-9963	LINEAR SHAPED CHG	1	WB	.8300	1.1D	A	AQ	A	0043
1336-00-406-9964	LINEAR SHAPED CHG	1	WB	.8300	1.1D	A	AQ	A	0043
1336-00-407-9617	INITIATOR	1	FB	.0002	1.4S	C	BE	C	0454
1336-00-407-9618	DET, S&A	1	FB	.0001	1.4B	C	FB	C	0365
1336-00-410-9407	FUZE, MK330 MOD 2	1	FB	.0010	(04)1.2D	C	BB	C	0409
1336-00-420-2980	GEN, GAS PRESSURE	1	MB	.2100	1.3C	C	EA	C	0275
1336-00-420-2981	INITIATOR	1	MB	.0004	1.4G	C	BW	C	0325
1336-00-420-2985	S&A DEVICE	1	MB	.0001	1.4B	C	BB	C	0257
1336-00-422-1853	CTG, IMPULSE	1	MB	.0024	1.4C	C	EA	C	0276
1336-00-427-9095	SQUIB, ELEC	1	FB	.0001	1.4S	C	BE	C	0454
1336-00-429-2500	IGNITER, GAS GEN	1	FB	.0100	1.4G	C	BE	C	0325
1336-00-432-2682	ARMING DEVICE	1	FB	.2235	1.1B	A	AZ	A	0106
1336-00-432-2699	ACTUATOR, EXPL, LINEAR	1	FB	.0001	1.4S	X	XX	OO	0349
1336-00-438-9692	DISP, CM	1	MB	.0033	1.4C	C	EA	C	0276
1336-00-445-9456	IGNITER, GAS GEN	1	FB	.1808	(04)1.2G	C	BW	C	0314
1336-00-455-7854	CTG, IMPULSE	1	MB	.0003	1.4C	C	BJ	C	0276
1336-00-455-7855	CTG, IMPULSE	1	MB	.0003	1.4C	C	BJ	C	0276
1336-00-458-3557	S&A DEVICE	1	MB	.0003	1.4S	C	BB	C	0367

Table 3-1. Explosives Haz. Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1330-00-935-2030	CTG, GRENADE, M195	2280	WC	.0030	1.4S	C	DC	OO	0014
1330-00-935-6064	GRENADE, HAND, M61	30	WB	.3400	(04)1.1F	A	BS	A	0292
1330-00-935-6092	GRENADE, HAND, MK1 MOD2 (E)	24	WB	.2200	1.3G	B	DH	B	0254
1330-00-965-0802	GRENADE, HAND, M7A3, CS (B)	16	WB	.7500	1.4G	IRR	DX	*IR	0301
1330-00-969-6824	GRENADE, HAND, ILL, MK1 MOD 1 (E)	25	WB	.2200	1.3G	B	DH	B	0254
1336-00-001-1649	WARHEAD, MK5 MOD 1	1	MB	54.0	1.1D	A	BI	A	0286
1336-00-001-1650	WARHEAD, MK86 MOD 1	1	MB	50.0	1.1D	A	BI	A	0286
1336-00-008-5328	FUZE, MK330 MOD 2	*	*	.3647	1.1D	A	AZ	A	0408
1336-00-014-0509	WARHEAD, MK38 MOD 0	1	MB	20.0	1.1D	A	BI	A	0286
1336-00-022-9378	SWITCH, SQUIB ACT	1	MB	.0002	1.4S	X	XX	OO	0349
1336-00-043-5277	FUZE, GUIDED MSL, MK312 MOD 0	8	WB	.3700	1.1B	A	AZ	A	0106
1336-00-043-5278	FUZE, GUIDED MSL, MK312 MOD 2	8	WB	.3700	1.1D	A	AZ	A	0408
1336-00-051-3571	EXPL CHG, M1	1	MB	.0018	1.1D	C	XZ	C	0290
1336-00-051-7573	GEN ASSY	1	FB	.0043	1.4C	C	EA	C	0276
1336-00-054-5341	TANK AND PRIMER ASSY	1	MB	.0001	1.4S	C	XG	C	0323
1336-00-062-5085	S&A DEVICE, W/O BOOSTER, MK35 MOD 0	1	FB	.0017	1.4S	C	BB	C	0367
1336-00-067-0138	EXPL CHG, M1	1	MB	.0009	1.4B	C	BJ	C	0383
1336-00-067-0139	EXPL CHG, M1	1	FB	.0054	1.4B	C	BJ	C	0383
1336-00-070-2472	GEN, GAS PRESSURE	1	FB	.0037	1.4C	C	EA	C	0276
1336-00-070-2484	VAVLE	*	*	.0006	1.4S	X	XX	OO	0349
1336-00-071-4138	INITIATOR, ELECTRIC	1	MC	.0070	1.4S	C	BE	C	0454
1336-00-076-1005	EXPL CHG, M1	1	MB	.0023	1.1D	C	XZ	C	0290
1336-00-076-3185	S&A MECH	1	FB	.0166	1.4B	C	BB	C	0257
1336-00-076-3186	BOOSTER, DELAY, SKIRT	1	FB	.0166	1.4G	C	BW	C	0325
1336-00-076-3188	BOOSTER, DELAY, SKIRT	1	FB	.0068	1.4G	C	BW	C	0325
1336-00-076-3189	S&A MECH	1	MB	.0003	1.4B	C	BB	C	0257
1336-00-076-4687	EXPL CHG, M1	1	MB	.0026	1.1D	C	XZ	C	0290
1336-00-076-4688	DETONATOR ASSY	1	FB	.0010	1.1B	C	BB	C	0030
1336-00-076-4715	EXPL CHG, M1	1	MB	.0030	1.1D	C	XZ	C	0290
1336-00-076-6180	BOOSTER, SKIRT REMOVAL	1	FB	.0014	1.4B	C	BB	C	0257
1336-00-077-0062	S&A DEVICE	1	MB	.0004	1.4B	C	BB	C	0257
1336-00-077-0065	S&A DEVICE	1	MB	.0023	1.4B	C	BB	C	0257
1336-00-078-6349	VALVE	1	MB	.0005	1.4S	X	XX	OO	0349
1336-00-079-3978	TANK & PRIMER ASSY	1	FB	.0002	1.4S	C	XG	C	0323
1336-00-092-8473	WARHEAD, MK85 MOD 1	1	MB	.3647	(04)1.2B	C	BB	C	0107
1336-00-104-0184	WARHEAD	1	MB	180.0	(12)1.2D	A	BI	A	0287
1336-00-106-6808	GEN, GAS PRESSURE	1	MC	4.6	1.3C	B	EM	B	0186
1336-00-106-6809	GEN, GAS PRESSURE	1	MC	2.5	1.3C	B	EM	B	0186
1336-00-126-6002	FUZE & TIMER ASSY	1	MB	.0008	1.4G	C	XT	C	0317
1336-00-126-6003	CABLE ASSY	1	MB	.0008	1.4S	C	BE	C	0454

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1336-00-127-4043	CABLE ASSY	1	MB	.0006	1.4S	C	BE	C	0454
1336-00-130-9251	WARHEAD	1	MB	370.7	1.1D	A	BI	A	0286
1336-00-133-5015	DET ASSY	1	FB	.0010	1.1B	C	BB	C	0030
1336-00-135-2872	WARHEAD, MK5 MOD 0	1	MB	54.0	1.1D	A	BI	A	0286
1336-00-136-6435	FUZE, DELAY	*	MB	.0125	1.4G	C	XT	C	0103
1336-00-152-3304	FUZE, GUIDED MSL, MK303 MOD 2	1	MB	.0771	1.1D	A	AZ	A	0408
1336-00-160-2797	FUZE, CM	1	MB	.2482	1.4G	C	XT	C	0103
1336-00-163-3121	SQUIB, ELEC	1	FB	.0001	1.4S	C	BE	C	0454
1336-00-236-4782	SQUIB, ELEC	100	FB	.0002	1.4S	C	BE	C	0454
1336-00-239-2262	EXPL CHG	1	FB	.0006	1.4B	C	BJ	C	0257
1336-00-239-2264	S&A MECH	1	MB	.0003	1.4B	C	BB	C	0257
1336-00-262-4156	EXPL BOLT ASSY	1	MB	.0010	1.4S	C	BJ	C	0173
1336-00-299-1491	CYL, SQUIB, ACT	1	FB	.0003	2.2S	NCG	XC	*NG	1046
1336-00-341-5810	WARHEAD, MK2 MOD 2	1	MB	2.6	1.1D	A	BI	A	0286
1336-00-344-4485	WARHEAD	1	MB	179.0	(12)1.2D	A	BI	A	0287
1336-00-350-9419	WARHEAD, MK48 MOD 5	2	MB	10.5	1.1D	A	BI	A	0168
1336-00-397-4220	GEN GAS, MK6	12	MB	.0360	1.4C	C	EA	C	0276
1336-00-400-1038	FUZE, INFLUENCE	1	MB	.0772	1.4S	X	XX	OO	0349
1336-00-400-4147	TIMER ASSY	1	MB	.0001	1.4S	X	XX	OO	0349
1336-00-403-0499	SQUIB, ELEC	1	FB	.0068	1.4S	C	EA	C	0323
1336-00-406-2765	FUZE, GUIDED MSL	1	MB	.1323	(04)1.2D	C	BB	C	0409
1336-00-406-9960	EXPL TRANSFER ASSY	1	MB	.1300	(04)1.2B	A	AZ	A	0107
1336-00-406-9961	CMD DEST, S&A	1	FB	.0009	1.4S	C	BB	C	0367
1336-00-406-9963	LINEAR SHAPED CHG	1	WB	.8300	1.1D	A	AQ	A	0043
1336-00-406-9964	LINEAR SHAPED CHG	1	WB	.8300	1.1D	A	AQ	A	0043
1336-00-407-9617	INITIATOR	1	FB	.0002	1.4S	C	BE	C	0454
1336-00-407-9618	DET, S&A	1	FB	.0001	1.4B	C	FB	C	0365
1336-00-410-9407	FUZE, MK330 MOD 2	1	FB	.0010	(04)1.2D	C	BB	C	0409
1336-00-420-2980	GEN, GAS PRESSURE	1	MB	.2100	1.3C	C	EA	C	0275
1336-00-420-2981	INITIATOR	1	MB	.0004	1.4G	C	BW	C	0325
1336-00-420-2985	S&A DEVICE	1	MB	.0001	1.4B	C	BB	C	0257
1336-00-422-1853	CTG, IMPULSE	1	MB	.0024	1.4C	C	EA	C	0276
1336-00-427-9095	SQUIB, ELEC	1	FB	.0001	1.4S	C	BE	C	0454
1336-00-429-2500	IGNITER, GAS GEN	1	FB	.0100	1.4G	C	BE	C	0325
1336-00-432-2682	ARMING DEVICE	1	FB	.2235	1.1B	A	AZ	A	0106
1336-00-432-2699	ACTUATOR, EXPL, LINEAR	1	FB	.0001	1.4S	X	XX	OO	0349
1336-00-438-9692	DISP, CM	1	MB	.0033	1.4C	C	EA	C	0276
1336-00-445-9456	IGNITER, GAS GEN	1	FB	.1808	(04)1.2G	C	BW	C	0314
1336-00-455-7854	CTG, IMPULSE	1	MB	.0003	1.4C	C	BJ	C	0276
1336-00-455-7855	CTG, IMPULSE	1	MB	.0003	1.4C	C	BJ	C	0276
1336-00-458-3557	S&A DEVICE	1	MB	.0003	1.4S	C	BB	C	0367

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1336-00-458-5228	ORDNANCE MODULE	1	MB	.0008	1.4S	C	EA	C	0323
1336-00-479-0408	ORDNANCE MANIFOLD	1	MB	.0032	1.4B	C	BJ	C	0350
1336-00-484-2544	CORD ASSY, DET	1	FB	.0004	1.4D	C	BB	C	0289
1336-00-497-3633	VALVE	1	MB	.0002	1.4S	X	XX	OO	0349
1336-00-516-5587	WARHEAD, MK8 MOD 1	2	MB	10.5	1.1D	A	BI	A	0286
1336-00-516-5588	BOOSTER, WARHEAD	*	WB	.0987	1.1D	A	AP	A	0042
1336-00-554-4666	PRIMER, ELECTRIC	*	WB	.0001	1.4S	C	BE	C	0454
1336-00-558-1859	FUZE & TIMER ASSY	1	MB	.2482	1.4G	C	XT	C	0103
1336-00-572-3072	TRIGGER	1	FB	.0003	1.4S	X	XX	OO	0349
1336-00-611-4389	FUZE, GUIDED MSL, MK303 MOD 2	1	MB	.0771	1.1D	A	AZ	A	0408
1336-00-611-4439	BOOSTER, MK34 MOD 1	*	WB	.077	1.1D	A	AP	A	0042

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1336-00-897-0720	WARHEAD, MK3	1	MB	4.9	1.1D	A	BI	A	0286
1336-00-898-6080	GAS GEN	*	MB	.5511	1.4C	C	EA	C	0276
1336-00-900-0054	CTG, IMPULSE	*	FB	.0005	1.4C	C	BE	C	0276
1336-00-901-3210	PRIMER, ELECTRIC	*	FB	.0001	1.4S	C	BE	C	0454
1336-00-901-6445	CTG, IMPULSE	1	MB	.0005	1.4C	C	BE	C	0276
1336-00-902-2282	PRIMER, ELECTRIC	*	FB	.0001	1.4S	C	BE	C	0454
1336-00-903-0256	WARHEAD, MK19 MOD 0	1	MB	103.6	1.1D	A	BI	A	0286
1336-00-906-9884	FUZE, GUIDED MSL, MK303 MOD 3	1	MB	.0771	1.1D	A	AZ	A	0408
1336-00-911-1500	WARHEAD, MK8 MOD 3	2	MB	10.5	1.1D	A	BI	A	0286
1336-00-912-4430	GEN ASSY	*	*	.0043	1.4C	C	EA	C	0276
1336-00-915-0823	EXPL CHG	1	MB	.0008	1.4B	C	BJ	C	0383
1336-00-915-0824	EXPL CHG	1	MB	.0010	1.4B	C	BJ	C	0383
1336-00-915-0826	BOOSTER ASSY	1	MB	.0158	(04)1.2G	C	BW	C	0314
1336-00-916-9921	S&A MECH	1	MB	.0003	1.4B	C	BB	C	0257
1336-00-916-9922	S&A MECH	1	MB	.0003	1.4B	C	BB	C	0257
1336-00-917-3109	DESTRUCT SYS	1	MB	.0018	1.1D	A	AQ	A	0043
1336-00-918-2556	SQUIB, ELEC	1	MB	.0002	1.4S	C	BE	C	0454
1336-00-923-6292	SWITCH, SQUIB ACT	1	MB	.0001	1.4S	X	XX	OO	0349
1336-00-930-3478	WARHEAD, MK68 MOD 0	1	MB	50.0	1.1D	A	BI	A	0286
1336-00-931-3590	EXPL CHG	1	MB	.0030	1.1D	C	XZ	C	0290
1336-00-932-2434	EXPL CHG	1	MB	.0024	1.1D	C	XZ	C	0290
1336-00-936-3421	DESTRUCT CHG	1	MB	.3100	1.1D	A	AZ	A	0290
1336-00-946-7418	TANK & PRIMER ASSY	1	MB	.0001	1.4S	C	XG	C	0349
1336-00-947-5143	DET ASSY	100	FB	.0318	1.1B	C	BB	C	0073
1336-00-948-1770	SQUIB, ELEC	1	MB	.0012	1.4S	C	BE	C	0454
1336-00-955-6310	FUZE, GUIDED MSL, FMU-31/B	1	MB	.1433	(04)1.2D	C	BB	C	0409
1336-00-961-7081	DESTRUCT SYS	1	MB	.8210	1.1D	A	AQ	A	0043
1336-00-975-8230	EXPL CHG ASSY	1	MB	.0003	1.4B	C	BB	C	0257
1336-00-976-0427	TRIGGER	1	FB	.0003	1.4S	X	XX	OO	0349
1336-00-988-4486	SAFETY SWITCH	1	FB	.0003	1.4S	X	XX	OO	0349
1336-00-991-9760	GEN, GAS PRESSURE	1	MB	.0043	1.4S	C	EA	C	0323
1336-00-999-2224	SQUIB, ELEC	1	MB	.0002	1.4S	C	BE	C	0454
1336-01-005-3959	S&A DEVICE, W/O BOOSTER, MK33 MOD 0	1	WB	.0017	1.4S	C	BB	C	0367
1336-01-006-0522	WARHEAD, MK71 MOD 0	1	MB	26.1	1.1D	A	BI	A	0286
1336-01-017-4030	S&A DEVICE, MK13 MOD 2	20	MB	.0039	1.4S	C	BB	C	0367
1336-01-020-4946	WARHEAD, MK8 MOD 4	2	MC	10.5	1.1D	A	BI	A	0286
1336-01-027-0089	FUZE, INFLUENCE, MK303 MOD 4	4	MB	.0771	1.1D	A	AZ	A	0408
1336-01-029-7387	SQUIB, GAS GEN	1	FB	.0198	1.4S	C	BE	C	0454
1336-01-033-8319	WARHEAD, WDU-22/B	1	MC	42.0	1.1D	A	BI	A	0286
1336-01-034-3393	WARHEAD, WAU-8/B	1	MC	42.0	1.1D	A	BI	A	0286

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1336-00-622-2407	CTG, IMPULSE	1	FB	.0017	1.4C	C	BE	C	0276
1336-00-658-3260	FUZE, GUIDED MSL, MK304 MOD 1	4	MB	.0771	1.1D	A	AZ	A	0408
1336-00-658-9705	WARHEAD, PRAC, MK2 MOD 0 (E)	2	MB	9.8	1.1G	A	BI	A	0094
1336-00-691-2231	FUZE, GUIDED MSL, MK304 MOD 2	4	MB	.0771	1.1D	A	AZ	A	0408
1336-00-706-9518	WARHEAD, MK8 MOD 2	2	MB	10.5	1.1D	A	BI	A	0286
1336-00-709-8321	IGNITER, GAS GEN	*	WB	.0012	1.4G	C	BW	C	0325
1336-00-731-0453	PRIMER ASSY	1	MB	.0001	1.4S	C	BE	C	0454
1336-00-738-6228	GEN, GAS PRESSURE	1	MB	2.5	1.3C	B	EM	B	0186
1336-00-756-4770	PRIMER, NONELECTRIC	1	MB	.0008	1.1B	A	FA	A	0029
1336-00-763-4991	EXPL CHG	1	MB	.0010	1.4B	C	BJ	C	0257
1336-00-764-4797	SQUIB, ELEC	1	MB	.0012	1.4S	C	BE	C	0454
1336-00-764-6305	SQUIB, ELEC	1	FB	.0001	1.4S	C	BE	C	0454
1336-00-764-6306	SQUIB, ELEC	1	FB	.0001	1.4S	C	BE	C	0454
1336-00-770-6367	WARHEAD, MK19 MOD 0	1	MB	103.5	1.1D	A	BI	A	0286
1336-00-770-6382	BOOSTER, WARHEAD, MK44	1	FB	.3638	1.1D	A	AP	A	0042
1336-00-770-6388	FUZE, GUIDED MSL, MK312 MOD 0	8	WB	.3700	1.1D	A	AZ	A	0408
1336-00-770-6401	WARHEAD	1	MB	103.5	1.1D	A	BI	A	0286
1336-00-776-6731	PISTOL, LOADED	1	MB	.0001	1.4S	C	BB	C	0367
1336-00-777-3312	ACTUATION SYS, HYDRAULIC	1	WB	.0003	2.2S	NCG	XC	*NG	1046
1336-00-783-7553	PRIMER ASSY	1	MB	.0001	1.4S	C	BE	C	0454
1336-00-786-5928	FUZE, GUIDED MSL	1	MB	.0010	1.4S	X	XX	OO	0349
1336-00-797-8845	FUZE, GUIDED MSL	20	FB	.3647	1.1D	A	AZ	A	0408
1336-00-801-7506	BOOSTER, FUZE MK38 MOD 1	1	WB	.1160	1.1D	A	AP	A	0042
1336-00-801-7549	S&A DEVICE, MK5 MOD 2	1	FB	.1200	1.1D	A	AZ	A	0408
1336-00-827-8481	CTG, IMPULSE	1	MB	.0970	1.4C	C	EA	C	0276
1336-00-829-1608	S&A DEVICE	*	*	.0003	1.4S	C	BB	C	0367
1336-00-831-7897	SWITCH, SQUIB ACT	1	MB	.0001	1.4S	X	XX	OO	0349
1336-00-854-0885	LINEAR SHAPED CHG	1	WC	.2000	1.1D	A	AQ	A	0043
1336-00-858-4298	WARHEAD	1	MB	371.0	1.1D	A	BI	A	0286
1336-00-858-4302	FUZE, GUIDED MSL, MK312 MOD 2	8	WB	.3700	1.1D	A	AZ	A	0408
1336-00-858-4315	WARHEAD, MK45 MOD 0	2	MB	10.5	1.1D	A	BI	A	0286
1336-00-863-4458	TANK & PRIMER ASSY	1	MB	.0001	1.4S	C	XG	C	0323
1336-00-877-5748	SQUIB, ELEC	1	MB	.0004	1.4S	C	BE	C	0454
1336-00-879-4428	WARHEAD, MK38 MOD 0	1	MB	20.2	1.1D	A	BI	A	0286
1336-00-883-5358	S&A DEVICE	1	FB	.0035	1.4S	C	BB	C	0367
1336-00-883-5360	BOOSTER, WARHEAD	1	FB	.2200	1.1D	A	AP	A	0042
1336-00-883-5361	WARHEAD	1	MB	85.0	1.1D	A	BI	A	0286
1336-00-885-0524	FUZE, GUIDED MSL, MK303 MOD 2	1	MB	.0771	1.1D	A	AZ	A	0408
1336-00-885-0527	CANISTER, COUNT	1	MB	.1000	(04)1.2B	C	BB	C	0107
1336-00-885-0528	CANISTER, COUNT	1	MB	.1000	(04)1.2B	C	BB	C	0107
1336-00-890-9866	SQUIB ELEC	1	FB	.0003	1.4S	C	BE	C	0454

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1336-01-034-3394	WARHEAD, WAU-9/B	1	MB	52.0	1.1D	A	BI	A	0286
1336-01-034-8690	SQUIB, GAS GEN	N/A	N/A	.0237	1.4S	C	BE	C	0454
1336-01-038-6205	S&A DEVICE, MK35 MOD 0, W/BOOSTER	4	MB	.1089	1.1D	A	AZ	A	0408
1336-01-044-7430	WARHEAD, WDU-17/B	2	MB	7.4	1.1D	A	BI	A	0286
1336-01-045-5731	SQUIB, ELEC	N/A	N/A	.0001	1.4S	C	BE	C	0454
1336-01-047-7132	DSU-21/B	4	MC	.0771	1.1D	A	AZ	A	0408
1336-01-057-3706	WARHEAD, WAU-10/B	1	MB	26.1	1.1D	A	BI	A	0286
1336-01-060-6502	SWITCH ASSY	*	FB	.0001	1.4S	X	XX	OO	0349
1336-01-076-7806	FUZE, COUNTERMEASURE, 300 SEC	N/A	N/A	.0180	1.4G	C	XT	C	0103
1336-01-079-9712	WARHEAD, MK54	2	MB	10.5	1.1D	A	BI	A	0286
1336-01-080-3046	TGT DET, DSU-21/B-1	4	MC	.0771	1.1D	A	AZ	A	0408
1336-01-080-3047	TGT DET, DSU-21/B-2	4	MC	.0771	1.1D	A	AZ	A	0408
1336-01-080-3048	TGT DET, DSU-21/B-3	4	MC	.0771	1.1D	A	AZ	A	0408
1336-01-080-3049	TGT DET, DSU-21/B-4	4	MC	.0771	1.1D	A	AZ	A	0408
1336-01-088-2231	S&A DEVICE, W/BOOSTER, MK33 MOD 0	1	WB	.1089	1.1B	A	AZ	A	0106
1336-01-093-4583	GAS GEN, MK1 MOD 0	*	MB	.5291	1.4C	C	EA	C	0276
1336-01-117-7614	SQUIB SWITCH	N/A	N/A	N/A	1.4S	X	XX	OO	0349
1336-01-118-4636	CTG, WING ACTUATOR	*	FB	.0300	1.4C	C	EA	C	0276
1336-01-118-4637	CTG, FIN ACTUATOR	*	FB	.0300	1.4C	C	EA	C	0276
1336-01-122-6914	GAS GEN UNIT	1	WB	.0007	2.2S	NCG	XB	NG	1066
1336-01-124-9369	RELEASE ASSEMBLY	*	WB	.0016	1.4S	C	BB	C	0367
1336-01-125-9400	CTG, ELEVON ACTUATOR	*	FB	.0290	1.4C	C	EA	C	0276
1336-01-128-7253	TANK ASSY, TMU-73/A	*	FB	.0003	2.2S	NCG	YN	OM	1072
1336-01-128-8416	TGT, DET, DSU-21/B	4	MC	.0771	1.1D	A	AZ	A	0408
1336-01-129-2305	WARHEAD, WAU-17/B	1	MB	36.0	1.1D	A	BI	A	0286
1336-01-129-5283	CTG, ENGINE STARTER, CJU-2/B	*	FB	.6550	1.3C	C	ED	C	0275
1336-01-146-0729	INITIATOR, ELEC	*	WB	.0007	1.4S	C	BE	C	0454
1336-01-159-3033	FUZE, FMU-111/B	1	MB	.0026	1.4D	C	BB	C	0410
1336-01-159-3039	BOOSTER, MK-44	1	MB	.2470	1.1D	A	AP	A	0042
1336-01-160-6451	S&A DEVICE	24	MB	.0028	1.4S	C	BB	C	0349
1336-01-160-9175	HYD ACT SYS	1	WB	.0003	2.2S	NCG	XC	NG	1046
1336-01-162-3422	WARHEAD, WAU-7/B	1	MB	45.2	1.1D	A	BI	A	0286
1336-01-165-5942	CTG, PRESSURE	*	FB	.0004	1.4S	C	BE	C	0454
1336-01-171-6948	WARHEAD, WAU-17A/B	1	MB	36.0	1.1D	A	BI	A	0286
1336-01-178-5834	INITIATOR	*	FB	.0005	1.4S	C	BE	C	0454
1336-01-179-1705	CENTER AFT SECTION, AGM-65D	1	*	85.0	1.1E	A	CR	A	0181
1336-01-180-2092	DOME COVER ACTUATOR	1	FB	.0001	1.4S	X	XX	OO	0349
1336-01-189-1245	RETAINER CHARGE RING	1	WB	.0400	1.4S	C	FC	C	0441
1336-01-196-3743	GAS GENERATOR	*	FB	.0012	1.4C	C	EA	C	0276
1336-01-201-1726	GAS GENERATOR	1	WB	7.1	1.4C	C	EA	C	0276
1336-01-201-3963	IGNITER, MX STAGE III	1	WB	5.6	1.1C	A	YG	A	0271

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1336-01-202-9196	INITIATOR, OXYGEN TANK	*	FB	.0004	1.4S	C	BE	C	0454
1336-01-202-9717	GAS GENERATOR	1	WB	1.6	1.4C	C	EA	C	0276
1336-01-230-5975	INITIATOR	*	FB	.0005	1.4S	C	BE	C	0454
1336-01-236-9443	HYD ACT SYS	1	WB	.0003	2.2S	NCG	XC	NG	1046
1336-01-247-6235	SPIN GENERATOR	1	WB	*	1.3C	B	EM	B	0186
1336-01-268-2093	GENERATOR, HOT GAS	1	MB	324.7	1.3C	B	EM	B	0186
1336-01-269-1166	TGT DET, DSU-21/B	4	MC	.0771	1.1D	A	AZ	A	0408
1336-01-286-9502	TANK ASSY, OXYGEN	*	FB	.0009	2.2S	NCG	YN	OM	1072
1336-01-289-3701	PNEUMATIC ACTUATION SYSTEM	1	WB	.0003	2.2S	NCG	XC	NG	1046
1337-00-010-5083	RKT MTR	1	MB	.0362	1.1C	A	EK	A	0280
1337-00-030-9019	IGNITER ASSY, MK274 MOD 1A	1	MB	.0727	(04)1.2G	B	XM	B	0314
1337-00-032-2462	RKT MTR, M5 NIKE	1	WC	755	1.3C	B	EM	B	0186
1337-00-050-8795	RKT MTR	1	MB	45,800	1.3C	B	EM	B	0186
1337-00-051-7570	SPIN MTR ASSY	1	MB	.0167	1.3C	B	EM	B	0186
1337-00-051-7572	DOOR ASSY, TUMBLE	1	MB	.0084	1.3C	B	EM	B	0186
1337-00-055-6930	PYROGEN ASSY	1	MB	2.0	1.3C	B	EM	B	0186
1337-00-055-8765	RKT MTR	1	MB	10,378	1.3C	B	EM	B	0186
1337-00-062-0078	IGNITER & S&A ASSY	1	MB	3.2	1.1C	A	EK	A	0280
1337-00-071-3787	RKT MTR, MK17	1	MB	43.2	1.3C	B	EM	B	0186
1337-00-072-5198	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-078-4250	RKT MTR, M55A1	1	MB	45,800	1.3C	B	EM	B	0186
1337-00-086-6956	IGNITER RKT MTR, MXU-239/A	1	MC	1.3	1.1C	A	EK	A	0280
1337-00-105-6649	RKT MTR, MK27 MOD 4	1	WB	560.0	1.3C	B	EM	B	0186
1337-00-113-0055	IGNITER MK274 MOD 0	1	MB	.0599	(04)1.2G	B	XM	B	0314
1337-00-113-0062	INITIATOR	1	FB	.0001	1.4S	C	DA	C	0454
1337-00-126-6012	RKT, CM	1	MB	.4174	(04)1.2C	B	XU	B	0281
1337-00-126-9699	RKT MTR, MK38 MOD 4	1	MB	91.6	1.3C	B	EM	B	0186
1337-00-127-4051	RKT MTR	1	MB	3.3	1.3C	B	EM	B	0186
1337-00-127-4052	RKT MTR	1	MB	3.0	1.3C	B	EM	B	0186
1337-00-127-4053	RKT MTR	1	MB	2.7	1.3C	B	EM	B	0186
1337-00-127-4055	RKT MTR	1	MB	2.0	1.3C	B	EM	B	0186
1337-00-127-8346	RKT MTR	1	MB	1.7	1.3C	B	EM	B	0186
1337-00-132-1931	RKT MTR	1	MB	3.7	1.1C	A	EK	A	0280
1337-00-163-6121	SYS SPIN FAIRING	N/A	N/A	.0167	1.3C	B	EM	B	0186
1337-00-163-6122	DOOR INSTAL FAIRING	N/A	N/A	.0084	1.3C	B	EM	B	0186
1337-00-179-9203	RKT MTR, MK52 MOD 2	1	MB	90.0	1.3C	B	EM	B	0186
1337-00-183-0945	RKT MTR, MK39 MOD 7	1	MB	92.0	1.3C	B	EM	B	0186
1337-00-186-8540	RKT MTR, MK78 MOD 0	1	MB	106	1.3C	B	EM	B	0186
1337-00-193-3205	RKT MTR	1	MB	2.0	(04)1.2C	B	XU	B	0281
1337-00-202-3812	RKT MTR	1	WB	1000	1.3C	B	EM	B	0186
1337-00-226-5378	RKT MTR	1	MB	3.5	1.1C	A	EK	A	0280

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1337-00-228-4724	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1337-00-550-7268	RKT MTR	4	MB	61.6	1.3C	B	EM	B	0186
1337-00-585-9774	RKT MTR, M58A2	1	MB	31.2	1.3C	B	EM	B	0186
1337-00-603-9450	RKT MTR	1	MB	1365	1.3C	B	EM	B	0186
1337-00-611-4346	BOOSTER MTR	1	MB	745.5	1.3C	B	EM	B	0186
1337-00-646-7324	RKT MTR	1	WB	3020	1.3C	B	EM	B	0186
1337-00-651-2062	RKT MTR	1	MB	5.5	1.3C	B	EM	B	0186
1337-00-658-9736	RKT MTR, MK17 MOD 1	1	MB	43.2	1.3C	B	EM	B	0186
1337-00-696-0832	RKT MTR, MK38 MOD 0	1	MB	91.6	1.3C	B	EM	B	0186
1337-00-706-9510	RKT MTR, MK11 MOD 5	1	WB	28.1	1.3C	B	EM	B	0186
1337-00-706-9522	RKT MTR	1	MB	70.0	1.3C	B	EM	B	0186
1337-00-706-9527	RKT MTR, MK17 MOD 0	1	MB	40.0	1.3C	B	EM	B	0186
1337-00-709-8317	IGNITER, RKT MTR	1	MB	.0150	(04)1.2G	B	XM	B	0314
1337-00-726-4713	RKT MTR	1	MB	2.1	1.3C	B	EM	B	0186
1337-00-727-2820	RKT MTR	9	PL	145.0	1.3C	B	EM	B	0186
1337-00-738-6062	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-740-1280	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-764-6337	RKT MTR	1	MB	45,800	1.3C	B	EM	B	0186
1337-00-767-7623	RKT MTR, M46	1	MB	26.5	1.3C	B	EM	B	0186
1337-00-783-5674	RKT MTR, XM22E8	1	MB	620.0	1.3C	B	EM	B	0186
1337-00-788-5395	RKT MTR, M56A1	1	MB	13,680	1.3C	B	EM	B	0186
1337-00-790-4144	IGNITER, RKT MTR	12	WB	.1100	(04)1.2G	B	XM	B	0314
1337-00-793-0855	SQUIB & INSER ASSY	1	FB	.0023	1.4S	C	BE	C	0454
1337-00-796-1628	INITIATOR	1	MB	.0066	1.4G	C	BW	C	0325
1337-00-799-3018	RKT MTR	1	MB	60.0	1.3C	B	EM	B	0186
1337-00-802-0733	SECTOR ASSY	1	MB	.0500	(04)1.2B	C	BJ	C	0382
1337-00-804-4368	RKT MTR, MK39 MOD 4	1	MB	92.0	1.3C	B	EM	B	0186
1337-00-804-4382	RKT MTR, MK38 MOD 3	1	MB	91.6	1.3C	B	EM	B	0186
1337-00-831-7891	IGNITER, CUTTER ASSY	1	MB	.0001	1.4S	C	BG	C	0070
1337-00-859-9647	PELLET, IGNITER	1	FB	.0660	1.3C	B	CK	B	0161
1337-00-867-9716	INITIATOR ASSY	1	MB	.0660	(04)1.2G	B	XM	B	0314
1337-00-877-9203	RKT MTR	1	MB	66.0	1.3C	B	EM	B	0186
1337-00-884-8991	ADAPTER & CASE ASSY	1	*	6565	1.3C	B	EM	B	0186
1337-00-885-9120	RKT MTR, MK6 MOD 3	16	PL	70.0	1.3C	B	EM	B	0186
1337-00-885-9122	IGNITER, RKT MTR	1	MB	.1600	(04)1.2G	B	XM	B	0314
1337-00-888-8246	INITIATOR ASSY	1	MB	.0660	(04)1.2G	B	XM	B	0314
1337-00-889-2074	RKT MTR, M100	1	WC	5900	1.3C	B	EM	B	0186
1337-00-891-5463	INITIATOR, RKT MTR	1	MC	.0023	1.4G	C	BW	C	0325
1337-00-891-5470	RKT MTR, M42A1	1	MB	3009	1.3C	B	EM	B	0186
1337-00-891-5471	IGNITER, RKT MTR	1	MB	.3040	1.1G	A	YG	A	0121
1337-00-903-0424	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-908-6851	RKT MTR, MK39 MOD 1	1	MB	92.0	1.3C	B	EM	B	0186

Pages 3-24A and 3-24B are deleted in their entirety.

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1337-00-232-4187	RKT MTR, SR109	1	WB	64.7	1.3C	B	EM	B	0186
1337-00-236-4866	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-239-9676	FUZE, RETENTION DEVICE	1	MB	.0025	1.4G	C	XT	C	0103
1337-00-251-1006	RKT MTR	1	WB	13680	1.3C	B	EM	B	0186
1337-00-260-0276	ORDNANCE SUBSYSTEM	1	FB	.0007	1.4B	C	BW	C	0383
1337-00-269-5030	IGNITER, RKT MTR	1	FB	.1760	(04)1.2G	B	XM	B	0314
1337-00-344-4472	IGNITER, RKT MTR	50	WB	.1100	(04)1.2G	B	XM	B	0314
1337-00-411-7050	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-411-7051	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-412-0167	IGNITER, GAS GEN	1	MB	.0220	(04)1.2G	C	BW	C	0314
1337-00-455-3751	IGNITER, RKT MTR	1	MB	7.2	1.3C	B	EM	B	0186
1337-00-455-7853	RKT MTR	1	MB	6.9	1.3C	B	EM	B	0186
1337-00-456-3487	INITIATOR	1	MB	.0055	1.4G	C	BW	C	0325
1337-00-463-1708	RKT MTR	1	WB	64.7	1.3C	B	EM	B	0186
1337-00-465-9582	IGNITER, MK274 MOD 1	1	MB	.0599	(04)1.2G	B	XM	B	0314
1337-00-469-7088	RKT MTR	1	MB	13680	1.3C	B	EM	B	0186
1337-00-469-7089	RKT MTR	1	MB	13680	1.3C	B	EM	B	0186
1337-00-470-3953	RKT MTR	1	WB	1000	1.3C	B	EM	B	0186
1337-00-470-3980	IGNITER & S & A DEVICE	1	MB	1.6	1.3C	B	EM	B	0186
1337-00-482-4651	ORDNANCE SUBSYSTEM	1	MB	.0025	1.4B	C	BB	C	0257
1337-00-493-4982	RKT MTR	1	MB	1.6	1.3C	B	EM	B	0186
1337-00-493-4983	RKT MTR	1	MB	1.4	1.3C	B	EM	B	0186
1337-00-493-4984	RKT MTR	1	MB	.9972	1.3C	B	EM	B	0186
1337-00-493-4985	RKT MTR	1	MB	3.3	(04)1.2C	B	XU	B	0281
1337-00-493-4986	RKT MTR	1	MB	3.0	(04)1.2C	B	XU	B	0281
1337-00-493-4987	RKT MTR	1	MB	2.7	(04)1.2C	B	XU	B	0281
1337-00-493-4988	RKT MTR	1	MB	2.3	(04)1.2C	B	XU	B	0281
1337-00-493-4989	RKT MTR	1	MB	1.6	(04)1.2C	B	XU	B	0281
1337-00-493-4990	RKT MTR	1	MB	1.4	(04)1.2C	B	XU	B	0281
1337-00-493-4991	RKT MTR	1	MB	.9972	(04)1.2C	B	XU	B	0281
1337-00-493-4992	RKT MTR	1	MB	.180	(04)1.2C	C	EA	C	0281
1337-00-494-8805	IGNITER, GEN	1	MB	.0044	1.4G	C	BW	C	0325
1337-00-494-8806	IGNITER	1	MB	1.5	1.3G	B	EM	B	0315
1337-00-504-3342	PYROGEN UNIT	1	MB	4.2	1.3C	B	EM	B	0186
1337-00-520-3507	RKT MTR	1	MB	7281	1.3C	B	EM	B	0186
1337-00-520-3509	S & A DEVICE	1	MB	.0076	1.4B	C	BB	C	0257
1337-00-520-3512	CORD ASSY, DET	1	MB	.0013	1.4D	C	BB	C	0410
1337-00-520-3513	MANIFOLD ASSY	1	MB	.0006	1.4B	C	BB	C	0257
1337-00-520-3539	CUTTER, THRUST, TERM	1	MB	.0490	(04)1.2B	C	BB	C	0107
1337-00-520-3540	GAS GEN	1	MB	4.7	1.3C	B	EM	B	0186
1337-00-546-2231	RKT MTR, M5E1, W/IGN	1	MB	750.2	1.3C	B	EM	B	0186

Table 3-1. Explosive Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	DOD HAZARD CLASS DOT CODES MKG 8	DOD HAZARD CLASS DOT CODES LAB 9	DOD HAZARD CLASS DOT CODES SER 10
1337-01-034-3396	RKT MTR, MK58 MOD 3	1	MB	135.2	1.3C	B	EM	B	0186
1337-01-047-9247	IGNITER, MXU-239/A	1	MC	1.3	1.1C	A	EK	A	0280
1337-01-061-8669	RKT MTR, MK36 MOD 7	1	MB	60.0	1.3C	B	EM	B	0186
1337-01-061-9508	RKT MTR, SR-116-HP-1	1	MB	53.0	1.3C	B	EM	B	0186
1337-01-062-6426	RKT MTR	1	MB	13,680	1.3C	B	EM	B	0186
1337-01-065-2388	RKT MTR, MK53 MOD 2	1	MB	89.0	1.3C	B	EM	B	0186
1337-01-072-0890	INITIATOR	1	MC	.0618	(04)1.2G	B	XM	B	0314
1337-01-073-0403	IGNITER, RAM JET	18	MC	.3870	1.3G	B	XM	B	0315
1337-01-074-0479	RKT MTR, SR-116-HP-1	1	MB	53.0	1.3C	B	EM	B	0186
1337-01-081-1716	RKT MTR	1	MB	13,680	1.3C	B	EM	B	0186
1337-01-081-1717	RKT MTR	1	MB	13,680	1.3C	B	EM	B	0186
1337-01-090-9294	RKT MTR, MK36 MOD 8	1	MB	60.0	1.3C	B	EM	B	0186
1337-01-107-2554	RKT MTR, SR-116-AJ-2	1	MB	53.0	1.3C	B	EM	B	0186
1337-01-118-4657	RKT MTR	1	WB	65.0	1.3C	B	EM	B	0186
1337-01-125-9423	INITIATOR ASSY	*	WB	.0008	1.4C	C	FB	C	0366
1337-01-131-7860	RKT MTR, MK36 MOD 9	4	MB	60.0	1.3C	B	EM	B	0186
1337-01-145-1963	RKT MTR, MK36 MOD 11	4	MB	60.0	1.3C	B	EM	B	0186
1337-01-145-9360	RKT MTR, MK36 MOD 10	4	MB	60.0	1.3C	B	EM	B	0186
1337-01-150-7939	RKT MTR, MK58 MOD 5	1	WB	133.3	1.3C	B	EM	B	0186
1337-01-157-2398	SHROUD	1	WB	6.9	1.3C	B	EM	B	0186
1337-01-160-7899	IGNITER, S&A DEVICE MK299 MOD 0	1	WB	.1640	(04)1.2G	B	XM	B	0314
1337-01-162-3421	ROCKET MTR, YSR113-TC-1	1	MB	280.5	1.3C	B	EM	B	0186
1337-01-193-2643	SHROUD TRACTOR MOTOR	1	WB	30.1	1.3C	B	EM	B	0186
1337-01-193-4250	IGNITER & SAFE/ARM DEVICE	1	WB	.3386	1.3C	B	XM	B	0186
1337-01-193-8050	THRU-BULKHEAD INITIATOR	*	FB	.0016	1.4S	X	XX	OO	0384
1337-01-195-1906	FIRING UNIT/EBW INIT ADAPTER ASSY	1	FB	.0021	1.4S	C	BB	C	0367
1337-01-196-7213	FUEL LINE SEVERANCE ASSY	1	FB	.0078	1.4S	C	EA	C	0323
1337-01-196-7214	EBW INITIATOR ADAPTER ASSY	*	FB	.0002	1.4S	X	XX	OO	0349
1337-01-206-5635	SHROUD SEPARATION CYLINDER ASSY	1	WB	.0505	1.4C	C	BB	C	0351
1337-01-250-1305	RKT MTR	1	MB	7281.0	1.3C	B	EM	B	0186
1337-01-267-2336	INITIATOR ASSY, ELECTRIC	12	WB	.0018	1.4S	C	FB	C	0366
1337-01-279-7886	ROCKET MOTOR, MX STAGE I	1	MB	99,133	1.3C	B	EM	B	0186
1337-01-279-7887	ROCKET MOTOR, STAGE II	1	MB	54120	1.3C	B	EM	B	0186
1337-01-280-8699	MSL MTR, STAGE III	1	MB	15,606	1.1C	A	EK	A	0280
1337-01-281-2122	ROCKET MOTOR, MX STAGE I	1	MB	99,133	1.3C	B	EM	B	0186
1337-01-304-0042	ROCKET MOTOR	1	WB	65.0	1.3C	B	EM	B	0186
1340-00-007-4889	RKT, HE 66MM, M72	15	WB	.8300	1.1E	A	CR	A	0181
1340-00-021-4478	RKT, M72A1	15	WB	.8300	1.1E	A	CR	A	0181
1340-00-021-4491	RKT, M72A2	15	WB	.8300	1.1E	A	CR	A	0181
1340-00-023-2013	RKT MTR	1	PL	145.0	1.3C	B	XL	B	0186
1340-00-038-8185	WARHEAD	14	MC	1.4	1.1D	A	BI	A	0286

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1337-00-908-6852	RKT MTR, MK38 MOD 1	1	MB	91.6	1.3C	B	EM	B	0186
1337-00-912-3642	IGNITER, RKT MTR	1	MB	4.0	1.3C	B	EM	B	0186
1337-00-912-3643	RKT MTR	1	MB	.1319	1.3C	B	EM	B	0186
1337-00-912-3644	RKT MTR	1	MB	.0706	1.3C	B	EM	B	0186
1337-00-915-4482	RKT MTR, MK39 MOD 3	1	MB	92.0	1.3C	B	EM	B	0186
1337-00-916-9889	RKT MTR, M55A1	1	MB	45800	1.3C	B	EM	B	0186
1337-00-921-6237	RKT MTR, MK39 MOD 2	1	MB	92.0	1.3C	B	EM	B	0186
1337-00-930-0942	RKT MTR, M57A1	1	MB	3671	1.1C	A	EK	A	0280
1337-00-937-4725	RKT MTR, MK52 MOD 1	1	MB	90.0	1.3C	B	EM	B	0186
1337-00-937-4726	RKT MTR, MK53 MOD 1	1	MB	92.0	1.3C	B	EM	B	0186
1337-00-939-8012	IGNITER ASSY	1	FB	.0070	(04)1.2G	B	XM	B	0314
1337-00-941-0774	IGNITER, GAS GEN	1	MB	.6614	(04)1.2G	C	BW	C	0314
1337-00-948-8150	S&A DEVICE	1	MB	.0007	1.4S	X	XX	OO	0349
1337-00-948-8151	IGNITER, RKT MTR	1	MB	6.9	1.3C	B	EM	B	0186
1337-00-952-3951	IGNITER, MK265, MOD 0	1	MB	.2600	(04)1.2G	B	XM	B	0314
1337-00-953-3505	RKT MTR, M55A1	1	MB	45,800	1.3C	B	EM	B	0186
1337-00-953-3506	RKT MTR, M55A1	1	MB	45,800	1.3C	B	EM	B	0186
1337-00-956-3714	IGNITER, RKT MTR	1	MB	6.9	1.3C	B	EM	B	0186
1337-00-956-3715	BOOSTER, ASSY	1	MB	.0050	1.4G	C	BW	C	0325
1337-00-957-4611	RKT MTR, M56A1	1	MB	10,378	1.3C	B	EM	B	0186
1337-00-958-1844	RKT MTR	1	MB	.0706	1.3C	B	EM	B	0186
1337-00-961-5036	RKT MTR, M56A1	1	MB	10,378	1.3C	B	EM	B	0186
1337-00-962-1669	INITIATOR	1	MB	.0002	1.4S	C	BE	C	0454
1337-00-964-9845	RKT MTR, M57A1	1	MB	3,671	1.1C	A	EK	A	0280
1337-00-967-6729	BASKET ASSY	1	MC	.0132	1.4G	C	BW	C	0325
1337-00-971-7132	RKT MTR	1	MB	13,680	1.3C	B	EM	B	0186
1337-00-971-9523	IGNITER, RKT MTR	1	MB	.0500	1.3C	B	EM	B	0186
1337-00-971-9525	IGNITER, RKT MTR	1	MC	2.3	1.3C	B	EM	B	0186
1337-00-973-0665	RKT MTR, XM100	1	WC	5,900	1.3C	B	EM	B	0186
1337-00-973-3793	S&A DEVICE	1	MB	.0007	1.4S	X	XX	OO	0349
1337-00-974-4872	RKT MTR	1	MB	4.5	1.3C	B	EM	B	0186
1337-00-981-0645	RKT MTR, M57A1	1	MB	3,671	1.1C	A	EK	A	0280
1337-00-983-8454	RKT MTR	1	MB	.0765	1.3C	B	EM	B	0186
1337-00-984-4774	RKT MTR	1	MB	.1319	1.3C	B	EM	B	0186
1337-00-987-3984	SECTOR ASSY	1	MB	.0365	(04)1.2B	C	BJ	C	0382
1337-00-989-4905	RKT MTR, MK38 MOD 2	1	MB	91.6	1.3C	B	EM	B	0186
1337-00-994-3084	IGNITER, XM69	1	MB	.1330	1.1G	A	YG	A	0121
1337-01-005-3992	RKT MTR, MK58 MOD 2	1	MB	135.2	1.3C	B	EM	B	0186
1337-01-007-0842	RKT MTR, MK58 MODS 0 & 1	1	MB	135.2	1.3C	B	EM	B	0186
1337-01-028-1424	S&A IGNITION ASSY	N/A	N/A	.0008	(04)1.2G	B	XM	B	0314
37-01-033-9546	RKT MTR, MK27 MOD 6		WB	562.0	1.3C	B	EM	B	

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1340-00-038-8186	WARHEAD	14	MC	1.4	1.1D	A	BI	A	0286

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1340-00-038-8188	WARHEAD	14	MC	1.4	1.1D	A	BI	A	0286
1340-00-038-8189	WARHEAD	14	MC	1.4	1.1D	A	BI	A	0286
1340-00-038-8190	WARHEAD	14	MC	1.4	1.1D	A	BI	A	0286
1340-00-038-8355	WARHEAD	1	WB	15.4	1.1D	A	BI	A	0286
1340-00-038-8445	RKT MTR	1	WB	24.8	1.3C	B	EM	B	0186
1340-00-038-9053	FUZE, RKT, MK176	80	WB	.0016	1.1D	A	AZ	A	0408
1340-00-038-9055	FUZE, RKT, MK178	80	WB	.0016	1.1D	A	AZ	A	0408
1340-00-062-0035	RKT MTR	1	WB	319.8	1.3C	B	EM	B	0186
1340-00-075-6550	IGNITER, RKT MTR	1	MB	.18	1.3C	B	EM	B	0186
1340-00-093-1065	RKT MTR, 15KS1000	12	PL	72.0	1.3C	B	XL	B	0186
1340-00-093-1069	RKT MTR, 2.2KS11000	1	MB	145.0	1.3C	B	EM	B	0186
1340-00-093-1075	IGNITER, RKT MTR	12	WB	.0750	(04)1.2G	B	BY	B	0314
1340-00-106-6814	RKT, PWN-8B	6	WB	18.2	1.3C	B	EM	B	0186
1340-00-118-9630	RKT MTR	1	WB	319.8	1.3C	B	EM	B	0186
1340-00-123-3352	IGNITER, RKT MTR, MK173	8	WB	.4960	(04)1.2G	B	XM	B	0314
1340-00-124-4193	WARHEAD, FLECHETTE, WDU-4A/A	4	WB	.0130	1.4S	C	DC	OO	0012
1340-00-143-6911	RKT PRACT, M73	90	WB	.0270	(04)1.2E	A	CR	A	0182
1340-00-143-7032	RKT, 66MM, M72A1	15	WB	.8300	1.1E	A	CR	A	0181
1340-00-143-7108	RKT, CHEM, 2.75 INCH WP (C)	4	WB	8.7	(04)1.2H	A	CW	A	0245
1340-00-157-5932	WARHEAD, FLECHETTE, WDU-13/A	4	WB	.0130	1.4S	C	DC	OO	0012
1340-00-157-6949	RKT MTR, SR105	6	WB	8.3	1.3C	B	EM	B	0186
1340-00-191-3315	RKT, MK40	4	WB	10.7	1.1E	A	CR	A	0181
1340-00-228-7224	RKT, 2.75 INCH, FLECHETTE	4	WB	6.4	1.3C	B	CV	B	0183
1340-00-239-5923	WARHEAD, M151	12	WB	2.3	1.1D	A	BI	A	0286
1340-00-255-7288	RKT PWN-10A (BX1)	2	WB	37.7	1.3C	B	EM	B	0186
1340-00-255-7288	RKT PWN-10A (BX2)	2	WB	.0200	1.4C	C	EA	C	0276
1340-00-255-7289	RKT PWN-11A (BX1)	2	WB	37.7	1.3C	B	EM	B	0186
1340-00-255-7289	RKT PWN-11A (BX2)	2	WB	.0100	1.4C	C	EA	C	0276
1340-00-255-7383	RKT PWN-12A (BX1)	2	WB	37.7	1.3C	B	EM	B	0186
1340-00-255-7383	RKT PWN-12A (BX2)	2	WB	.0100	1.4C	C	EA	C	0276
1340-00-293-8619	RKT MTR, M3A1C	1	WC	2200.0	1.3C	B	EM	B	0186
1340-00-293-9238	RKT MTR, 762MM, M3A1C	1	WB	2200	1.3C	B	EM	B	0186
1340-00-309-5056	RKT MTR, MK10	1	WB	24.9	1.3C	B	EM	B	0186
1340-00-309-5073	JATO, 14DS1000	1	WB	71.0	1.3C	B	XL	B	0186
1340-00-309-5092	RKT MTR, 15KS1000	12	PL	72.0	1.3C	B	XL	B	0186
1340-00-309-5095	IGNITER, MK165	12	WB	.0750	(04)1.2G	B	BY	B	0314
1340-00-309-5097	RKT HEAD, MK1	4	WB	1.4	1.1D	A	BI	A	0286
1340-00-309-5098	WARHEAD MK5	4	WB	.9200	1.1D	A	BI	A	0286
1340-00-326-6539	IGNITER, RKT MTR, M31A1	1	MC	.3400	(04)1.2G	B	BY	B	0314

Pages 3-28A and 3-28B are deleted in their entirety.

Table 3-1. Explosives ard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	DOD HAZARD CLASS DOT CODES MKG 8	DOD HAZARD CLASS DOT CODES LAB 9	DOD HAZARD CLASS DOT CODES SER 10
1340-00-935-6028	WARHEAD, MK1	4	WB	1.4	1.1D	A	BI	A	0286
1340-00-935-6077	RKT MTR, MK4	6	WB	6.4	1.3C	B	EM	B	0186
1340-00-935-6081	RKT, MK4	4	WB	8.72	1.1E	A	CR	A	0181
1340-00-935-9161	RKT, CHEM, 2.75-INCH WP (C)	4	WB	8.6	(04)1.2H	A	CW	A	0245
1340-00-935-9285	RKT, 66MM, M72A2	15	WB	.8300	1.1E	A	CR	A	0181
1340-00-973-1928	RKT MTR, M66A1	1	WB	1,847	1.1C	A	EK	A	0280
1340-00-973-3853	RKT MTR	1	MB	247.0	1.1C	A	EK	A	0280
1340-01-010-0991	FIRING MECH	1	MB	.0080	1.4S	X	XX	OO	0349
1340-01-029-8012	RKT, 66MM, M72A2	15	WC	.8300	1.1E	A	CR	A	0181
1340-01-048-3955	S&A IGNITION ASSY	N/A	N/A	.0006	(04)1.2G	B	XM	B	0314
1340-01-051-1189	WARHEAD, M257 FLARE	6	WB	5.0	1.3G	B	DH	B	0335
1340-01-097-6365	RKT MTR, MK23 MOD 2	9	PL	108.0	1.3C	B	XL	B	0186
1340-01-104-7841	IGNITER, MK296 MOD 0	8	WB	.3308	(04)1.2G	B	XM	B	0314
1340-01-108-8854	RKT MTR, MK66 MOD 1	6	WB	7.0	1.3C	B	EM	B	0186
1340-01-130-6282	RKT MTR	144	WC	1.1	1.3G	B	DH	B	0016
1340-01-130-6418	IGNITER, RKT MTR	144	WC	.0122	1.4G	C	BW	C	0325
1340-01-154-1679	RKT MTR, MK66 MOD 2	6	WB	7.02	1.3C	B	EM	B	0186
1340-01-188-2744	RKT MTR, TX-632	1	MB	60.0	1.3C	B	EM	B	0186
1340-01-231-3984	JET THRUST UNIT MK23 MOD 3	1	MB	105.0	1.3C	B	XL	B	0186
1340-01-295-5139	RKT MTR, SR-121-NP-2	1	WB	60.7	1.3C	B	EM	B	0186
1345-00-028-5131	MINE, M16	4	WB	1.2	(08)1.2F	A	BH	A	0294
1345-00-096-3093	MINE, M14	90	WB	.0625	1.1D	A	BH	A	0137
1345-00-710-6946	MINE, M18A1	6	WB	1.5	1.1D	A	BH	A/M	0137
1345-00-926-3950	MINE, M18A1	6	WB	1.5	1.1D	A	BH	A	0137
1345-01-144-6444	DISP & BOMB, CBU-89/B	2	MB	116.1	1.1D	A	BF	A	0034
1345-01-161-0661	DISP & BOMB, CBU-89(T-2)/B	2	MB	.0942	1.4D	C	FC	C	0237
1345-01-162-4296	DISP & BOMB, CBU-89(T-1)/B	2	MB	.0689	1.4D	C	FC	C	0237
1345-01-162-4297	DISP & BOMB, CBU-89(T-4)/B	2	MB	.4845	1.4D	C	FC	C	0237
1345-01-225-0685	DISP & BOMB, CBU-89/B	2	MB	116.1	1.1D	A	BF	A	0034
1345-01-293-9001	DISP & BOMB, CBU-89A/B	2	MB	116.1	1.1D	A	BF	A	0034
1351-00-477-8846	ARMING DEVICE, DESTRUCT	1	MC	.0216	(04)1.2D	C	BB	C	0409
1351-00-477-8852	MODIFICATION KIT	1	MC	.5900	1.1D	A	AP	A	0042
1365-00-219-8512	SMK POT (DE)	3	WB	11.00	1.4G	C	DF	C	0303
1365-00-283-9046	DISP RIOT CONT AGENT (B)	144	WB	N/A	1.4G	IRR	YI9	IR	0301
1365-00-293-9239	CHEM AGENT, GB (A)	1	MC		6.1K	PA	XS6	PG	2016
1365-00-383-3909	CHEM AGENT, CN (B)	1250	WB		6.1G	IRR	DS	*IR	2017
1365-00-598-5207	SMK POT, M5HC (DE)	2	WB	32.0	1.4G	C	DF	C	0303
1365-00-690-8656	CS CAPSULES (B)	2500	WB		6.1G	IRR	YH	*IR	1693
1365-00-926-1914	CHEM AGENT, CS-1 (B)	5	WB		6.1G	IRR	YH	*IR	1693
1365-00-935-6016	RIOT CONTROL AGENT (B)	5	WB		6.1G	IRR	YH	*IR	1693
1365-01-003-9143	MINISTREAMER (B)	6	FB	N/A	1.4G	IRR	YH	*IR	0301

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1340-00-339-4696	RKT MTR, M3A1C	1	WC	2200.0	1.3C	B	EM	B	0186
1340-00-350-7804	RKT MTR	1	WB	319.8	1.3C	B	EM	B	0186
1340-00-403-5254	CHG KIT, DEMOLITION	1	FB	.0600	(04)1.2B	C	BB	C	0107
1340-00-443-1511	RKT MTR, MK16	1	WB	35.0	1.3C	B	EM	B	0186
1340-00-471-1952	RKT MTR, SR110	2	WB	37.6	1.3C	B	EM	B	0186
1340-00-554-1985	RKT MTR	4	WB	5.9	1.3C	B	EM	B	0186
1340-00-585-4461	FIRING MECH, RKT	1	MB	.0080	1.4S	X	XX	OO	0349
1340-00-585-6584	IGNITER, RKT MTR	12	WB	.0750	(04)1.2G	B	BY	B	0314
1340-00-620-3410	RKT MTR, MK4	6	WB	6.4	1.3C	B	EM	B	0186
1340-00-620-3444	RKT MTR, MK4	6	WB	6.4	1.3C	B	EM	B	0186
1340-00-629-2613	RKT MTR, M3A2	1	WC	2200	1.3C	B	EM	B	0186
1340-00-678-6280	CHG KIT	1	WB	.8200	1.1D	A	BF	A	0048
1340-00-689-4075	RKT, 2.75 INCH, H.E.	4	WB	2.0	1.1E	A	CR	A	0181
1340-00-689-4080	WARHEAD, 2.75 INCH, RKT DUAL, M247	4	WB	2.0	1.1D	A	BI	A	0286
1340-00-693-5813	FIRING MECH, RKT	1	MB	.0080	1.4S	X	XX	OO	0349
1340-00-725-8382	WARHEAD, M151	192	WB	2.4	1.1D	A	BI	A	0286
1340-00-725-9484	WARHEAD, M151	192	WB	2.3	1.1D	A	BI	A	0286
1340-00-740-0509	RKT MTR	1	WB	319.8	1.3C	B	EM	B	0186
1340-00-752-7830	RKT MTR, M3A1C	1	WC	2200.0	1.3C	B	EM	B	0186
1340-00-752-7832	RKT MTR, M3A1C	1	WC	2200.0	1.3C	B	EM	B	0186
1340-00-755-9861	IGNITER RKT MTR	1	WB	.1800	1.3C	B	EM	B	0186
1340-00-768-0640	RKT MTR, MK16	1	WB	35.0	1.3C	B	EM	B	0186
1340-00-769-5304	FUZE, RKT, M427	12	WB	.0200	1.1D	A	AZ	A	0408
1340-00-778-9485	RKT MTR, 762MM M66	1	WB	1847	1.1C	A	EK	A	0280
1340-00-782-5848	WARHEAD, SMK, 2.75 INCH, M156 WP (C)	4	WB	2.3	(04)1.2H	A	BI2	A	0245
1340-00-782-5849	WARHEAD, SMK, 2.75 INCH, M156 WP (C)	4	WB	2.3	(04)1.2H	A	BI2	A	0245
1340-00-798-4320	BATTERY & CABLE ASSY	1	FB	.0020	1.4S	X	XX	OO	0349
1340-00-875-9166	ARMING DEVICE	1	FB	.5270	1.4S	C	BB	C	0367
1340-00-879-3968	WARHEAD, FLECHETTE	4	WB	.0130	1.4S	C	DC	OO	0012
1340-00-890-3903	RKT MTR, PWN-8B	4	WB	18.1	1.3C	B	EM	B	0186
1340-00-890-3904	IGNITER	*	*	.0550	1.3G	B	XM	B	0315
1340-00-910-9694	RKT MTR	6	WB	6.4	1.3C	B	EM	B	0186
1340-00-911-3927	WARHEAD, MK1	14	WB	1.4	1.1D	A	BI	A	0286
1340-00-912-4548	RKT, CHEM, 2.75 INCH WP (C)	8	WB	8.625	(04)1.2H	A	CW	A	0245
1340-00-926-3992	FUZE, RKT, M427	12	MC	.0250	1.1B	A	AZ	A	0166
1340-00-926-4086	RKT, 66MM	15	WB	.8300	1.1E	A	CR	A	0181
1340-00-926-9416	RKT, MK4	4	WB	8.72	1.1E	A	CR	A	0181
1340-00-926-9423	RKT, CHEM, 2.711-INCH WP (C)	4	WB	8.7	(04)1.2H	A	CW	A	0245
1340-00-935-1946	FUZE, RKT, M427	81	WB	.0200	1.1D	A	AZ	A	0408
[illegible]-00-935-1953	RKT, CHEM, 2.711-INCH WP (C)		WB	8.6	(04)1.2H	A	CW	A	0
-00-935-6021	RKT MTR, MK40		WB	6.4	1.3C	B	EM	B	0[illegible]

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	DOD HAZARD CLASS DOT CODES MKG 8	DOD HAZARD CLASS DOT CODES LAB 9	DOD HAZARD CLASS DOT CODES SER 10
1365-01-168-3693	DISP, CHEM, MACE, MKIV B	(B)	25	FB	N/A	6.1G	IRR	YP	IR	1693
1370-00-005-6719	SIGNAL SMK, LUU-10/B	(E)	1	MC	10.7	1.4G	C	DG	C	0197
1370-00-009-9596	STARTER, FIRE, M2	(E)	100	WB	.0096	1.3G	B	DH	B	0315
1370-00-025-4896	HEAT SOURCE, IR TRACER	(E)	26	WB	1.5	1.3G	B	DH	B	0093
1370-00-028-5114	SIMULATOR, FLASH, ART, M110	(E)	30	WB	.1790	1.3G	B	DH	B	0050

Table 3-1. Explosive Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1370-00-618-5774	SIGNAL, ILL, AN-M55A2	(E)	80	WB	.0857	1.3G	B	DH	B	0054
1370-00-618-5775	SIGNAL, ILL, AN-M56A2	(E)	80	WB	.0857	1.3G	B	DH	B	0054
1370-00-618-5776	SIGNAL, ILL, AN-M57A2	(E)	80	WB	.0857	1.3G	B	DH	B	0054
1370-00-618-5777	SIGNAL, ILL, AN-M58A2	(E)	80	WB	.0857	1.3G	B	DH	B	0054
1370-00-618-5784	SIGNAL, ILL, AN-M39A2	(E)	80	WB	.1437	1.3G	B	DH	B	0054
1370-00-618-5786	SIGNAL, ILL, AN-M38A2	(E)	80	WB	.1437	1.3G	B	DH	B	0054
1370-00-618-5788	SIGNAL, ILL, AN-M41A2	(E)	80	WB	.1437	1.3G	B	DH	B	0054
1370-00-618-5789	SIGNAL, ILL, AN-M42A2	(E)	80	WB	.1437	1.3G	B	DH	B	0054
1370-00-618-5790	SIGNAL, ILL, AN-M43A2	(E)	80	WB	.1062	1.3G	B	DH	B	0054
1370-00-618-5791	SIGNAL, ILL, AN-M44A2	(E)	80	WB	.1062	1.3G	B	DH	B	0054
1370-00-618-5793	SIGNAL, ILL, AN-M53A2	(E)	80	WB	.0875	1.3G	B	DH	B	0054
1370-00-618-5794	SIGNAL, ILL, AN-M54A2	(E)	80	WB	.0875	1.3G	B	DH	B	0054
1370-00-670-5793	FLARE, AERIAL INFRARED, TAU-15/B	(E)	25	FB	.9400	1.3G	B	DH	B	0093
1370-00-690-1458	MKR, LOCATION, MARINE, MK25 MOD 3	(E)	224	PL	2.0	1.3G	B	DH	B	0195
1370-00-725-7849	SIGNAL, SMK & ILL, MK6 MOD 3	(E)	4	WB	4.0	1.3G	B	DH	B	0254
1370-00-752-8060	FLARE, M49A1	(E)	32	WB	.3000	1.3G	B	DH	B	0092
1370-00-752-8124	SIMULATOR, HAND GRENADE, M116A1	(E)	150	WB	.0813	1.3G	B	DH	B	0335
1370-00-752-8126	SIMULATOR, PROJECTILE, M115A2	(E)	100	WB	.1410	(04)1.2G	B	DH	B	0334
1370-00-753-1859	SIGNAL, ILL, M127A1	(E)	36	WB	.1800	1.3G	B	DH	B	0054
1370-00-767-7622	FLARE, IR, W112/B	(E)	48	WB	.2700	1.3G	B	DH	B	0093
1370-00-787-2788	FLARE, MSL, MK27 MOD 0	(E)	20	MB	.0700	1.3G	B	DH	B	0093
1370-00-800-9973	FUSEE, RED, 15 MINUTE		72	FB	.2075	1.4G	FS	CN	FS	0336
1370-00-862-6114	FLARE, SET ALA-17	(E)	1	WB	22.9	1.3G	B	DH	B	0093
1370-00-901-0605	CTG, PHOTOFLASH, M123A1	(E)	12	WB	1.8	1.1G	A	BF	A	0094
1370-00-918-7052	FLARE, ACFT, MK24 MOD 4	(E)	6	WC	16.0	1.3G	B	DH	B	0093
1370-00-921-6172	SIGNAL KIT, A/P-25-S-1	(E)	50	FB	.0560	1.3G	C	DR	C	0093
1370-00-984-4472	FLARE, ACFT, M9A1	(E)	14	WB	1.3	1.3G	B	DH	B	0093
1370-01-018-9288	CTG ASSY, FLARE, ALA-17A	(E)	8	WB	2.8	1.3G	B	DH	B	0093
1370-01-030-8330	SIGNAL, SMK & ILL, MK124 MOD 1	(E)	108	WB	.2000	1.4G	C	EQ	C	0191
1370-01-033-3395	FLARE, LUU-4/B	(E)	36	PL	12.3	1.3G	B	DH	B	0093
1370-01-038-5111	FLARE, MJU-7/B	(E)	15	WB	.6278	1.3G	B	DH	B	0093
1370-01-039-2827	FLARE, DECOY, MJU-2/B	(E)	26	WB	.4900	1.3G	B	DH	B	0093
1370-01-048-2138	FLARE, M206	(E)	100	WC	.2866	1.3G	B	DH	B	0093
1370-01-071-1044	CTG, CHAFF RR-141D/AL		58	WB	.0004	1.4S	C	BJ	C	0173
1370-01-073-6281	FLARE, RR-119/B	(E)	26	WB	1.5	1.3G	B	DH	B	0093
1370-01-074-0591	MKR MARINE, MK58 MOD 1	(E)	2	MC	4.85	1.3G	B	DH	B	0335
1370-01-083-0320	FLARE, KIT, LUU-2B/B	(E)	36	WC	22	1.3G	B	DH	B	0093
1370-01-083-0322	FLARE, KIT, LUU-2B/B	(E)	36	WC	22	1.3G	B	DH	B	0093
1370-01-083-0323	FLARE, LUU-2B/B	(E)	2	WB	22	1.3G	B	DH	B	0093

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR =RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1370-00-028-5252	DETONATOR, SIMULATOR, M80	(E)	2500	WB	.0074	1.1G	A	BT	A	0333
1370-00-028-5255	SIMULATOR, BOOBY TRAP, M119	(E)	150	WB	.0095	1.3G	B	DH	B	0335
1370-00-028-5256	SIMULATOR, BOOBY TRAP, M117	(E)	150	WB	.0060	1.3G	B	DH	B	0335
1370-00-028-5257	SIMULATOR, BOOBY TRAP, M118	(E)	150	WB	.0110	1.3G	B	DH	B	0335
1370-00-028-5923	CTG, PHOTOFLASH, M112A1	(E)	40	WB	.4380	1.1G	A	BF	A	0094
1370-00-028-5924	CTG, PHOTOFLASH, M112	(E)	40	WB	.4380	1.1G	A	BF	A	0094
1370-00-028-5931	FLARE, M8A1	(E)	2	WB	10.3	1.3G	B	DH	B	0093
1370-00-028-5933	FLARE, M9A1	(E)	14	WB	1.4	1.3G	B	DH	B	0093
1370-00-028-5941	FLARE, M76	(E)	1	WB	20.4	1.3G	B	DH	B	0093
1370-00-028-5978	SIGNAL, ILL, AN-M54A1	(E)	80	WB	.0875	1.3G	B	DH	B	0054
1370-00-028-5982	SIGNAL, ILL, AN-M56A1	(E)	80	WB	.0875	1.3G	B	DH	B	0054
1370-00-028-6007	SIMULATOR, PROJECTILE, M74A1	(E)	80	WB	.0825	1.3G	B	DH	B	0335
1370-00-038-4921	MKR, LOCATION, MARINE, MK1 MOD 3	(E)	10	WB	.0650	1.3G	B	DH	B	0054
1370-00-054-5342	FLARE SET, ALA-17	(E)	1	WB	22.9	1.3G	B	DH	B	0093
1370-00-077-3391	FLARE, GUIDED MSL, TAU-56/B	(E)	20	WB	2.0	1.3G	B	DH	B	0093
1370-00-088-5658	FLARE, MK45 MOD 0	(E)	36	PL	18.0	1.3G	B	DH	B	0093
1370-00-092-9922	SIGNAL, SMK & ILL, MK5 MOD 4	(E)	8	WB	1.2	1.3G	B	DH	B	0054
1370-00-096-3135	FUSEE, WARNING, RR, M72	(E)	40	WB	.5600	1.4G	FS	CN	*FS	0336
1370-00-096-3137	SIGNAL, ILL, M131	(E)	25	WB	.1140	1.3G	B	DH	B	0054
1370-00-104-5614	FLARE, TGT, MKR, LUU-1B	(E)	36	WC	16.0	1.3G	B	DH	B	0093
1370-00-115-3432	SIGNAL, SMK & ILL, MK13 MOD 0	(E)	108	WC	.2120	1.4G	C	EQ	C	0191
1370-00-135-1590	FLARE, TGT, MKR, LUU-5	(E)	36	WC	16.0	1.3G	B	DH	B	0093
1370-00-135-1601	CTG, CHAFF		40	WB	.0043	1.4S	C	EA	C	0323
1370-00-135-2870	FLARE, MK24 MOD 4	(E)	36	WC	16.0	1.3G	B	DH	B	0093
1370-00-166-2160	FLARE, MJU-3A/B	(E)	2	WB	21.8	1.3G	B	DH	B	0093
1370-00-219-8566	STARTER, FIRE, M2	(E)	500	WB	.0096	1.3G	B	DH	B	0315
1370-00-249-9410	FLARE, DECOY, MK50 MOD 0	(DE)	80	WB	.2100	1.3G	B	DH	B	0093
1370-00-292-8411	FLARE, ACFT, LUU-2A/B	(E)	48	PL	22.0	1.3G	B	DH	B	0093
1370-00-309-5021	MKR, LOCATION, MARINE, MK2	(DE)	20	WB	1.2	1.3L	FS	BO	*FS	0249
1370-00-309-5028	SIGNAL, SMK & ILL, MK13 MOD 0	(E)	108	WB	.2120	1.4G	C	EQ	C	0191
1370-00-351-0222	FLARE, LUU-2/B	(E)	36	WC	22.0	1.3G	B	DH	B	0093
1370-00-445-8926	CTG ASSY, FLARE	(E)	8	WB	2.8	1.3G	B	DH	B	0092
1370-00-490-7362	SIGNAL, KIT, A/P-25S-5A	(E)	100	WB	.0812	1.3G	C	DR	C	0093
1370-00-490-7363	SIGNAL, ILL, RED	(E)	200	WB	.0812	1.3G	C	DR	C	0054
1370-00-490-7364	SIGNAL, ILL, GREEN	(E)	200	WB	.0812	1.3G	C	DR	C	0054
1370-00-490-7365	SIGNAL, ILL, WHITE	(E)	200	WB	.0812	1.3G	C	DR	C	0054
1370-00-567-2817	SIGNAL, MK13 MOD 0, SMK & ILL	(E)	36	WB	.2120	1.4G	C	EQ	C	0191
1370-00-617-2451	CHAFF PKG, RR141A/L		58	WB	.0004	1.4S	C	BJ	C	0173
1370-00-618-2401	SIGNAL, ILL, AN-M37A2	(E)	80	WB	.1437	1.3G	B	DH	B	0054
1370-00-618-2402	SIGNAL, ILL, AN-M45A2	(E)	80	WB	.1062	1.3G	B	DH	B	0054
1370-00-618-2403	SIGNAL, ILL, AN-M40A2	(E)	80	WB	.1437	1.3G	B	DH	B	0054

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-051-9053	SEVERANCE ASSY	1	FB	.0047	1.4S	C	BB	C	0367
1377-00-051-9088	COVER ASSY	1	FB	.0066	1.4S	C	BB	C	0367
1377-00-054-5331	EJECTOR, PARA	1	FB	.0059	1.4S	C	EA	C	0323
1377-00-060-0885	CUTTER, CTG, ACTUATED	80	WB	.0040	1.4S	C	BG	C	0070
1377-00-060-0886	CUTTER, CTG, ACTUATED	80	WB	.0064	1.4S	C	BG	C	0070
1377-00-061-8045	CATAPULT, ACFT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-061-8046	CATAPULT, ACFT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-061-8047	CATAPULT, ACFT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-062-0038	CTG, ENG, STARTER, MXU-4A/A	96	WB	8.0	1.4C	C	ED	C	0276
1377-00-062-0192	CORD ASSY, DET	1	FB	.0004	1.4S	X	XX	OO	0349
1377-00-062-0203	INITIATOR, DELAY	1	FB	.0018	1.4C	C	BB	C	0276
1377-00-062-0219	SEVERANCE ASSY	1	FB	.0370	1.4S	C	BB	C	0367
1377-00-062-0221	SEVERANCE ASSY	1	FB	.0370	1.4S	C	BB	C	0367
1377-00-062-5879	INITIATOR, M72	20	FB	1.0	1.4C	C	EA	C	0276
1377-00-062-5880	CTG, DELAY	400	WB	.0120	1.4C	C	DC	OO	0276
1377-00-063-4546	EJECTOR, PARA	1	FB	.0059	1.4S	C	EA	C	0323
1377-00-064-6654	EXPL KIT, MLU-7/B	96	WB	.0105	1.4S	C	BB	C	0367
1377-00-065-4619	CTG, IMPULSE, MK47 MOD 0	25	FB	.0446	1.4C	C	DC	OO	0276
1377-00-066-1560	CTG, DELAY, MK4 MOD 1	25	FB	.0002	1.4S	C	DC	OO	0323
1377-00-066-1561	CTG, DELAY, MK5 MOD 1	25	FB	.0002	1.4S	C	DC	OO	0323
1377-00-068-0256	CATAPULT, ACFT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-070-2485	CUTTER, CTG, ACTUATED	1	MB	.0001	1.4S	C	BG	C	0070
1377-00-070-2490	CTG, DELAY	1	FB	.0025	1.4S	C	DC	OO	0323
1377-00-074-3200	CONNECTOR, MANIFOLD ASSY	1	FB	.0004	1.4S	X	XX	OO	0349
1377-00-075-5846	CTG, IMPULSE, MK8 MOD 0	10	MC	.0438	1.4C	C	DC	OO	0276
1377-00-078-1841	COVER ASSY	1	FB	.0049	1.4S	C	BB	C	0367
1377-00-078-6345	CATAPULT, ACFT	2	WB	6.3	1.3C	B	EM	B	0186
1377-00-079-3999	THRUSTER	1	FB	.0023	1.4S	C	EA	C	0323
1377-00-079-4000	SLIDE BLOCK ASSY	1	FB	.0127	1.4S	C	BB	C	0367
1377-00-079-4002	CORD ASSY, DET	1	FB	.0048	1.4D	C	BB	C	0289
1377-00-079-4003	CORD ASSY, DET	1	FB	.0057	1.4D	C	BB	C	0289
1377-00-079-4007	MANIFOLD ASSY	1	FB	.0004	1.4B	C	BB	C	0257
1377-00-083-8754	CTG, IMPULSE, MK49 MOD 0	25	FB	.0003	1.4C	C	DC	OO	0276
1377-00-087-7103	CTG, ACFT FIRE EXT	1	FB	.0009	1.4S	C	XV	C	0323
1377-00-088-5632	CATAPULT, RKT	2	WB	10.0	1.3C	B	XU	B	0275
1377-00-095-5805	CTG	*	*	.0016	1.4S	C	DC	C	0174
1377-00-095-9917	CTG, EXPL BOLT	10	FB	.0110	(04)1.2B	C	BJ	C	0107
1377-00-100-0128	ACTUATOR, ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-100-0129	ACTUATOR, ASSY	1	FB	.0154	1.4C	C	EA	C	0276

Table 3-1. Explosives ..ard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1375-01-083-2821	FLSC	3	WB	.3428	1.1D	A	BT	A	0288
1375-01-083-2822	FLSC	6	WB	.0342	1.1D	A	BT	A	0288
1375-01-083-6325	FLSC	3	WB	.2285	1.1D	A	BT	A	0288
1375-01-122-7640	PRIMER, M29A1	100	FB	.0001	1.4S	C	DE	OO	0044
1375-01-180-5779	WATER GEL	6	FB	.5000	1.1D	A	BT	A	0241
1375-01-192-7411	CANINE EXP SCENT KIT	1	WB	18.0	1.1D	A	BT	A	0048
1375-01-192-9174	CAP, BLASTING, M6	180	WB	.0028	1.1B	A	FA	A	0030
1375-01-193-2976	CAP, BLASTING, M7	480	WB	.0027	1.1B	A	FA	A	0029
1375-01-329-0775	DYNAMITE, AMON NITRATE 50%	100	WB	.5000	1.1D	A	BT	A	0081
1375-01-333-1893	DYNAMITE, NITROGLYCERIN 50%	100	FB	.5000	1.1D	A	BT	A	0081
1376-00-277-2413	DET, STAB, M55	N/A	N/A	N/A	1.4B	C	CE	OO	0365
1376-00-628-3333	TNT, FLAKED, TYPE 1	1	FB	55.0	1.1D	A	BT	A	0209
1376-00-709-8320	PROPELLANT GRAIN	*	MC	.6600	1.3C	B	CK	B	0274
1376-01-204-9783	PROPELLANT (INFALLIBLE)				1.1C	A	CJ	A	0160
1376-01-204-9784	BKN03 2R PELLETS				1.3C	B	CK	B	0161
1376-01-204-9785	PROPELLANT (H8)				1.3C	B	CK	B	0161
1376-01-204-9786	PROPELLANT NOSOL-318				1.3C	B	CK	B	0161
1377-00-003-7269	CTG, DELAY, CCU-18/B	*	WB	.0038	1.4S	C	DC	OO	0323
1377-00-003-7270	CTG, DELAY, CCU-17/B	*	WB	.0039	1.4S	C	DC	OO	0323
1377-00-006-7879	INITIATOR, JAU-13/A	1	FB	.0001	1.4C	C	EA	C	0276
1377-00-006-7880	INITIATOR, JAU-14/A	1	FB	N/A	1.4C	C	EA	C	0276
1377-00-009-6045	EXPL JETT SET	1	MC	.0119	1.4B	C	BB	C	0257
1377-00-009-6046	EXPL JETT SET	1	MC	.0070	1.4B	C	BB	C	0257
1377-00-009-6047	EXPL JETT SET	1	MC	.0046	1.4B	C	BB	C	0257
1377-00-011-3427	CTG, IGNITION	1	FB	.0420	1.4G	C	BW	C	0325
1377-00-011-9082	PARTS KIT, CUTTER	1	FB	.0002	1.4S	C	BG	C	0070
1377-00-016-4805	PARA KIT	4	WB	.1502	1.4S	C	EA	C	0323
1377-00-017-0682	CTG, DELAY	24	WB	.0003	1.4S	C	DC	OO	0323
1377-00-021-4213	CTG, IMPULSE, MK17 MOD 1	384	MC	.0031	1.4C	C	DC	OO	0276
1377-00-025-1751	CTG, DELAY, M293	N/A	N/A	.0110	1.4C	C	DC	OO	0276
1377-00-027-1124	CTG, IMPULSE	1	FB	.0176	(04)1.2C	C	DC	OO	0381
1377-00-028-6128	CTG, IMPULSE, M29A2	300	FB	.0210	1.4C	C	DC	OO	0276
1377-00-028-6129	CTG, IMPULSE, M28A1	2	MB	.2000	1.4C	C	EA	C	0276
1377-00-029-3659	INITIATOR, XM120	20	FB	.0110	1.4C	C	EA	C	0276
1377-00-035-6021	SQUIB, ELEC, S68-6	50	FB	.0009	1.4S	C	BE	C	0454
1377-00-035-6024	SQUIB, ELEC, S68-15	50	FB	.0021	1.4S	C	BE	C	0454
1377-00-041-1313	SQUIB, ELEC, S68-4	50	FB	.0006	1.4S	C	BE	C	0454
1377-00-042-9551	CTG, ACFT FIRE EXT	1	FB	.0009	1.4S	C	XV	C	0323
1377-00-050-6793	CUTTER, CTG, ACTUATED	1	FB	.0009	1.4S	C	BG	C	0070
1377-00-051-7574	CUTTER, CTG, ACTUATED	1	MB	.0009	1.4S	C	BG	C	0070
1377-00-051-7575	CUTTER, CTG, ACTUATED	1	MB	.0009	1.4S	C	BG	C	0070

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-115-7444	CORD ASSY, DET	1	FB	.0005	1.4S	X	XX	OO	0349
1377-00-115-7445	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-115-7446	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-115-7447	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7448	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7449	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7450	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-115-7451	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7452	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7453	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7454	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-115-7455	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7456	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7457	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7458	CORD ASSY, DET	1	FB	.0005	1.4S	X	XX	OO	0349
1377-00-115-7459	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7460	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7461	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-115-7462	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-115-7463	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-115-7464	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-115-7465	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-115-7466	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7467	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7468	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-115-7469	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-115-7470	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7471	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7472	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7473	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-115-7474	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7475	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-115-7476	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7477	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7478	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7479	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7480	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-115-7481	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7482	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7483	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-115-7484	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-102-5343	CORD ASSY, DET	1	FB	.0052	1.4D	C	BB	C	0289
1377-00-102-5344	CORD ASSY, DET	1	FB	.0060	1.4D	C	BB	C	0289
1377-00-102-5345	CORD ASSY, DET	1	FB	.0063	1.4D	C	BB	C	0289
1377-00-102-5346	CORD ASSY, DET	1	FB	.0073	1.4D	C	BB	C	0289
1377-00-102-5347	CORD ASSY, DET	1	FB	.0077	1.4D	C	BB	C	0289
1377-00-102-5348	CORD ASSY, DET	1	FB	.0084	1.4D	C	BB	C	0289
1377-00-102-5349	CORD ASSY, DET	1	FB	.0095	1.4D	C	BB	C	0289
1377-00-102-5350	CORD ASSY, DET	1	FB	.0101	1.4D	C	BB	C	0289
1377-00-102-5353	CORD ASSY, DET	1	FB	.0069	1.4D	C	BB	C	0289
1377-00-103-3434	CTG, IMPULSE, MK2 MOD 1	10	MC	.0139	1.4C	C	DC	OO	0276
1377-00-105-6659	CTG, DELAY, MK4 MOD 2	4	MC	.0003	1.4S	C	DC	OO	0323
1377-00-105-6661	CTG, DELAY, MK5 MOD 2	4	MC	.0003	1.4S	C	DC	OO	0323
1377-00-106-7771	GUN & CABLE ASSY	1	FB	.0024	1.4S	C	EA	C	0323
1377-00-106-7772	DROGUE GUN ASSY	1	FB	.0065	1.4S	C	EA	C	0323
1377-00-106-7792	CTG, IMPULSE, MK124 MOD 0	10	MC	.0189	1.4C	C	DC	OO	0276
1377-00-109-1580	KIT, EMERGENCY EXIT	1	WB	20.0	1.4S	C	BB	C	0367
1377-00-110-6579	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-110-6580	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-110-6581	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-110-6582	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	OO	0349
1377-00-110-6583	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-110-6584	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-110-6585	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-110-6586	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-110-6587	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	OO	0349
1377-00-110-6588	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-110-6589	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-110-6590	CORD ASSY, DET	1	FB	.0017	1.4S	X	XX	OO	0349
1377-00-110-6591	CORD ASSY, DET	1	FB	.0019	1.4S	X	XX	OO	0349
1377-00-110-6592	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-110-6593	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-112-2606	BOLT, EXPL	25	WB	.0013	1.4S	C	BJ	C	0173
1377-00-113-6882	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-113-6883	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-113-6884	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-113-6885	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-113-6886	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-113-9049	CTG, IMPULSE, EX80 MOD 0	1	FB	.0003	1.4C	C	BE	C	0276
1377-00-115-4607	CATAPULT, ACFT, M38	1	WB	6.7	1.3C	B	EM	B	0186
1377-00-115-7442	CORD ASSY, DET		FB	.0009	1.4S	X	XX	OO	
1377-00-115-7443	CORD ASSY, DET		FB	.0009	1.4S	X	XX	OO	

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		=RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-118-0733	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0734	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0735	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0736	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0737	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0738	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0739	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-118-0740	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-118-0741	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0742	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0743	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0746	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0748	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	00	0349
1377-00-118-0760	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	00	0349
1377-00-118-0766	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0767	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0768	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0769	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	00	0349
1377-00-118-0772	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0773	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-118-0779	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0785	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0791	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-118-0792	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	00	0349
1377-00-118-0793	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	00	0349
1377-00-118-0794	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-118-0795	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-118-0796	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	00	0349
1377-00-118-0797	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	00	0349
1377-00-118-0798	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0799	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	00	0349
1377-00-118-0801	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-118-0802	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-118-0811	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-119-2022	RKT MTR, MK82 MOD 0	1	FB	.6400	1.3C	B	EM	B	0186
1377-00-119-2033	VERNIER RKT, MK84 MOD 0	1	FB	1.1	1.3C	B	EM	B	0186
1377-00-119-2055	RKT MTR, MK92	1	WB	6.5	1.3C	B	EM	B	0186
1377-00-119-2056	IGNITION ELEMENT MK17 MOD 0	48	FB	.0006	1.4S	C	BE	C	0454
1377-00-119-2061	CTG, IMPULSE MK107 MOD 0	4	MC	.0550	1.4C	C	DC	00	0276
1377-00-119-2706	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-120-8622	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-115-7485	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7486	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7487	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7488	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-115-7489	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-115-7490	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7491	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-115-7493	CORD ASSY, DET	1	FB	.0300	1.4S	X	XX	OO	0349
1377-00-115-7494	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7495	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7496	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7497	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7498	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7499	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7501	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7502	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-7503	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-7504	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-9785	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-9786	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-115-9787	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-115-9788	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-9789	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-9790	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-9791	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-115-9792	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-115-9793	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-115-9794	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-9795	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-115-9796	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-9797	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-115-9798	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-115-9799	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-116-4439	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-117-2792	CTG, IMPULSE, M270	1	WB	.1323	1.4C	C	DC	OO	0276
1377-00-117-2795	INITIATOR	20	FB	.0011	1.4C	C	EA	C	0276
1377-00-118-0727	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-118-0728	CORD ASSY, DET	1	FB	.1650	1.4S	X	XX	OO	0349
1377-00-118-0730	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-118-0731	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-118-0732	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	349

Table 3-1. Explosives ...zard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-121-4289	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4291	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4292	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4293	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4294	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4295	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4299	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-121-4312	CORD ASSY, DET	1	FB	.0015	1.4S	X	XX	OO	0349
1377-00-121-4317	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4319	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4320	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4323	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4325	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4326	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-121-4327	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-121-4334	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4335	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4341	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-121-4342	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4343	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4346	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-121-4347	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4350	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4360	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4361	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-121-4365	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4371	CORD ASSY, DET	1	FB	.0015	1.4S	X	XX	OO	0349
1377-00-121-4374	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4376	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-121-4377	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4378	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-121-4379	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-123-3905	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-123-3912	CORD ASSY, DET	1	FB	.1370	1.4S	X	XX	OO	0349
1377-00-123-3914	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-125-0074	ACTUATOR, KIT, DEPLOYMENT	1	FB	.0005	1.4S	X	XX	OO	0349
1377-00-125-7777	CATAPULT	1	WB	6.7	1.3C	B	EM	B	0186
1377-00-135-0313	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-135-0314	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-135-0315	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-135-0316	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-120-8626	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-120-8627	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	OO	0349
1377-00-120-8628	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-120-8629	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-120-8630	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-120-8631	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-120-8632	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-120-8633	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-120-8634	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-120-8636	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-120-8637	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-120-8638	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-120-8639	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-120-8640	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-120-8641	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-120-8642	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-120-8643	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4254	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4255	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4256	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4258	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4261	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4262	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4262	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4264	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4265	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4266	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4267	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4268	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4269	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4270	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4271	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4273	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-121-4274	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-121-4275	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-121-4276	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-121-4277	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-121-4278	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4286	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-121-4287	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
7-00-121-4288	CORD ASSY, DET		FB	.0007	1.4S	X	XX	OO	03

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-135-0358	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-135-0359	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0360	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-135-0361	INITIATOR	1	FB	.0009	1.4C	C	BB	C	0276
1377-00-135-7890	INITIATOR	1	FB	.0007	1.4C	C	BB	C	0276
1377-00-138-2871	CART REMOVER	*	*	.0302	1.4C	C	EA	C	0276
1377-00-138-3770	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-00-139-0956	GUN & CABLE ASSY	1	FB	.0024	1.4S	C	EA	C	0323
1377-00-139-8506	CUTTER, CTG, ACTUATED	1	FB	.0008	1.4S	C	BG	C	0070
1377-00-139-8529	CTG, DELAY	1	FB	.0010	1.4S	C	DC	OO	0323
1377-00-140-2651	CTG, ACFT FIRE EXT	1	FB	.0009	1.4S	C	XV	C	0323
1377-00-146-3425	EXTRACTION RKT	1	WB	6.5	1.3C	B	EM	B	0186
1377-00-147-6777	GEN GAS	*	*	.0077	1.4S	C	DC	OO	0012
1377-00-147-6778	INITIATOR	1	FB	.0077	1.4C	C	EA	C	0276
1377-00-152-7155	EXTRACTION RKT	1	WB	6.5	1.3C	B	EM	B	0186
1377-00-159-3275	CATAPULT, ACFT	2	WB	10.0	1.3C	B	EM	B	0186
1377-00-162-7136	CTG, IMPULSE	1	FB	.0439	1.4C	C	EA	C	0276
1377-00-163-6119	CUTTER, CTG, ACTUATED	1	FB	.0002	1.4S	C	BG	C	0070
1377-00-167-8320	EXPL CONTAINER ASSY	1	FB	.0143	1.4S	C	BB	C	0367
1377-00-167-8321	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-167-8322	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8324	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8325	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8326	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8327	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8328	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-167-8329	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-167-8330	CORD ASSY, DET	1	FB	.0026	1.4S	X	XX	OO	0349
1377-00-167-8333	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-167-8334	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8338	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-167-8339	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8340	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-167-8404	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-167-8405	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-167-8406	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-167-8407	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-167-8408	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8409	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-167-8410	CORD ASSY, DET	1	FB	.0017	1.4S	X	XX	OO	0349
1377-00-167-8411	CORD ASSY, DET	1	FB	.0017	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-135-0317	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-135-0318	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-135-0319	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-135-0320	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0321	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-135-0322	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0323	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0324	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-135-0325	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0326	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	OO	0349
1377-00-135-0327	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-135-0328	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-135-0329	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0330	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0331	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-135-0332	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-135-0333	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-135-0334	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-135-0335	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-135-0336	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-135-0337	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-135-0338	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0339	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-135-0340	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-135-0341	CORD ASSY, DET	1	FB	.0015	1.4S	X	XX	OO	0349
1377-00-135-0342	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	OO	0349
1377-00-135-0343	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0344	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0345	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0346	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0347	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0348	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0349	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0350	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0351	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0352	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-135-0353	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-135-0354	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-135-0355	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-135-0356	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-135-0357	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	03

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		≠RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-183-3995	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	00	0349
1377-00-183-3998	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	00	0349
1377-00-183-3999	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	00	0349
1377-00-183-4004	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	00	0349
1377-00-183-4006	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-183-4007	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	00	0349
1377-00-183-4008	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	00	0349
1377-00-183-4009	CORD ASSY, DET	1	FB	.0005	1.4S	X	XX	00	0349
1377-00-183-4013	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	00	0349
1377-00-183-4014	CORD ASSY, DET	1	FB	.0002	1.4S	X	XX	00	0349
1377-00-183-4015	CORD ASSY, DET	1	FB	.0002	1.4S	X	XX	00	0349
1377-00-183-4018	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-183-4019	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-183-4237	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-183-4238	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-183-4242	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	00	0349
1377-00-183-4243	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	00	0349
1377-00-183-4245	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	00	0349
1377-00-183-4246	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	00	0349
1377-00-183-4247	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	00	0349
1377-00-183-4248	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-183-4249	CORD ASSY, DET	1	FB	.0018	1.4S	X	XX	00	0349
1377-00-183-4251	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-183-4257	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	00	0349
1377-00-183-4258	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	00	0349
1377-00-183-4259	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-183-4260	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	00	0349
1377-00-183-4261	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	00	0349
1377-00-183-4263	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-183-4265	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-183-4267	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	00	0349
1377-00-183-4268	CORD ASSY, DET	1	FB	.0047	1.4S	X	XX	00	0349
1377-00-183-5952	CTG, IMPULSE, CCU-1/B	320	MC	.0139	1.4C	C	DC	00	0276
1377-00-188-4086	CTG, ACFT FIRE EXT	1	FB	.0007	1.4S	C	XV	C	0323
1377-00-191-5141	CTG, IMPULSE, CCU-11/B	1	FB	.1726	1.3C	B	XU	B	0275
1377-00-193-4910	CTG, IMPULSE	*	*	.0160	1.4C	C	DC	00	0276
1377-00-193-8832	CTG, IMPULSE, MK124 MOD 0	40	MC	.0189	1.4C	C	DC	00	0276
1377-00-195-2685	ACTIVATOR ASSY	1	FB	.0023	1.4S	C	BJ	C	0173
1377-00-201-8838	CATAPULT, ACFT, CKU-2/A	2	WB	6.7	1.3C	B	EM	B	0186
1377-00-219-8567	SQUIB, ELEC	500	WB	.0003	1.4S	C	BE	C	0454
1377-00-222-9062	INITIATOR, M113	1	FB	.0004	1.4C	C	EA	C	0276

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-167-8412	CORD ASSY, DET	1	FB	.0017	1.4S	X	XX	OO	0349
1377-00-167-8413	CORD ASSY, DET	1	FB	.0017	1.4S	X	XX	OO	0349
1377-00-167-8414	CORD ASSY, DET	1	FB	.0016	1.4S	X	XX	OO	0349
1377-00-167-8415	CORD ASSY, DET	1	FB	.0016	1.4S	X	XX	OO	0349
1377-00-167-8416	CORD ASSY, DET	1	FB	.0020	1.4S	X	XX	OO	0349
1377-00-167-8417	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-167-8418	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-167-8419	CORD ASSY, DET	1	FB	.0014	1.4S	X	XX	OO	0349
1377-00-167-8420	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-167-8421	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-167-8448	CORD ASSY, DET	1	FB	.0015	1.4S	X	XX	OO	0349
1377-00-167-8449	CORD ASSY, DET	1	FB	.0015	1.4S	X	XX	OO	0349
1377-00-167-8450	CORD ASSY, DET	1	FB	.0018	1.4S	X	XX	OO	0349
1377-00-167-8451	CORD ASSY, DET	1	FB	.0018	1.4S	X	XX	OO	0349
1377-00-167-8453	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-167-8454	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-169-7187	SEVERANCE ASSY	1	FB	.0047	1.4S	C	BB	C	0367
1377-00-169-7195	SEVERANCE ASSY	1	FB	.0014	1.4S	C	BB	C	0367
1377-00-169-7200	THRUSTER	100	WB	.0004	1.4S	C	BJ	C	0173
1377-00-172-0428	CTG, ACFT, FIRE EXT	1	FB	.0009	1.4S	C	XV	C	0323
1377-00-174-5024	CTG, ACFT, FIRE EXT	1	FB	.0009	1.4S	C	XV	C	0323
1377-00-178-9481	BOLT, EXPL	1	FB	.0005	1.4S	C	BJ	C	0173
1377-00-182-3020	INITIATOR, JAU-2/A25	1	FB	.0020	1.4C	C	EA	C	0276
1377-00-183-0973	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-183-0974	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-183-0975	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-183-0976	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-183-0977	CORD ASSY, DET	1	FB	.0007	1.4C	X	XX	OO	0349
1377-00-183-0978	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-183-0979	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-183-0980	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-183-0982	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-183-0983	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-183-0984	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-183-0985	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-183-1086	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-183-1268	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-183-1711	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-183-2357	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-183-2685	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-183-2980	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-286-2033	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2034	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-286-2035	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-286-2036	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-286-2037	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-288-4985	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-288-4989	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-288-4996	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-288-5015	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-288-5016	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-288-5024	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-288-5047	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-288-5049	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-291-8330	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-291-8332	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-291-8334	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-292-8454	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-292-8456	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-292-8481	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-292-8512	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-292-8514	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-292-8516	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-292-8518	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-292-8522	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-292-8524	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-292-8709	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-292-8724	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-292-8725	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-293-5672	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-293-5673	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-293-8183	CTG, IMPULSE, MK1 MOD 3	26	MC	.0631	1.4C	C	DC	OO	0276
1377-00-293-8184	CTG, IMPULSE, MK2 MOD 1	52	MC	.0139	1.4C	C	DC	OO	0276
1377-00-294-1191	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	C	DC	OO	0174
1377-00-294-2508	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-294-2509	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-294-2510	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-295-2179	INITIATOR	1	FB	N/A	1.4C	X	XX	OO	0276
1377-00-295-2181	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-295-2184	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-295-2206	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-299-1500	INITIATOR	1	FB	.0005	1.4C	C	BB	C	0276

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-222-9063	CTG, M36A1	N/A	N/A	N/A	1.4C	C	EA	C	0276
1377-00-236-6903	CTG, DELAY	*	*	.0015	1.4S	C	DC	OO	0323
1377-00-238-0552	INITIATOR	1	FB	.0030	1.4C	C	DC	OO	0276
1377-00-238-0553	CTG, DELAY	1	FB	.0025	1.4S	C	DC	OO	0323
1377-00-238-0554	INITIATOR	1	FB	.0004	1.4C	C	DC	OO	0276
1377-00-238-9325	INITIATOR, M104	1	FB	.0040	1.4C	C	EA	C	0276
1377-00-241-1595	GEN ASSY	1	FB	.0400	1.4C	C	EA	C	0276
1377-00-245-7970	CTG, DELAY	1	FB	.0025	1.4S	C	DC	OO	0323
1377-00-253-4436	CTG, ASSY	500	WB	.0001	1.4S	C	EA	C	0323
1377-00-255-2554	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-260-0253	CTG, IMPULSE	1	FB	.0007	1.4C	C	DC	OO	0276
1377-00-260-0279	CTG, IMPULSE	1	FB	.0891	(04)1.2C	B	XU	B	0381
1377-00-261-5361	PARTS KIT, CUTTER	1	FB	.0002	1.4S	C	DC	OO	0012
1377-00-261-5371	CTG, IMPULSE	1	FB	.0013	1.4C	C	EA	C	0276
1377-00-262-1679	CATAPULT, RKT	1	WB	5.5	1.3C	B	EM	B	0186
1377-00-262-1680	REMOVER, RAU-1/A	1	FB	.0800	1.4S	C	EA	C	0323
1377-00-263-4126	INITIATOR	10	FB	.0024	1.4C	C	DC	OO	0276
1377-00-269-5031	EXPL KIT	1	FB	.0052	1.4S	C	BB	C	0367
1377-00-280-0272	CTG, ACFT FIRE EXT	1	FB	.0008	1.4S	C	XV	C	0323
1377-00-286-1880	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-286-1884	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-1886	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-1999	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2000	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-286-2001	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2002	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2003	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-286-2004	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2005	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-286-2006	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2014	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-286-2015	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2022	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-286-2023	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-286-2024	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2027	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2028	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2029	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-286-2030	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-286-2031	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-286-2032	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-349-3950	CTG, IMPULSE	1	FB	.0529	1.4C	C	EA	C	0276
1377-00-349-3957	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-350-0694	CUTTER, CANOPY	1	FB	.0088	1.1D	A	AP	A	0043
1377-00-350-0698	GEN, GAS PRESSURE	1	FB	.9600	1.4C	C	EA	C	0276
1377-00-351-5503	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-351-5508	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-351-5512	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-351-5531	INITIATOR	1	FB	.0006	1.4C	C	BB	C	0276
1377-00-356-3728	CUTTER, CTG, ACTUATED	*	FB	.0003	1.4S	C	BG	C	0070
1377-00-359-2097	ROTARY ACTUATOR	*	FB	.0155	1.4C	C	EA	C	0276
1377-00-392-2706	CATAPULT, ACFT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-394-5842	CATAPULT, ACFT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-399-1492	GUN & CABLE ASSY	1	FB	.0024	1.4S	C	EA	C	0323
1377-00-400-1023	CORD ASSY, DET	1	FB	.0042	1.4D	C	BB	C	0289
1377-00-403-4827	INITIATOR, JAU-8/A25	1	FB	.0040	1.4C	C	EA	C	0276
1377-00-403-5816	CTG, IMPULSE, M31A2	N/A	N/A	.0536	1.4S	C	DC	OO	0014
1377-00-406-9569	CTG, IMPULSE	1	FB	.0020	1.4C	C	EA	C	0276
1377-00-407-9649	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-407-9650	EXPL KIT	1	FB	.0066	1.4S	C	BB	C	0367
1377-00-407-9651	EXPL KIT	1	FB	.0039	1.4S	C	BB	C	0367
1377-00-407-9652	CTG, KIT, SHIP	1	FB	.1513	(04)1.2C	B	XU	B	0381
1377-00-407-9653	EXPL KIT	1	FB	.2120	1.4S	X	XX	OO	0349
1377-00-408-7468	EXPL KIT	1	FB	.0651	1.4S	C	BB	C	0367
1377-00-408-7469	EXPL KIT	1	FB	.0037	1.4S	C	DC	OO	0012
1377-00-408-7470	EXPL KIT	1	WB	.1567	1.4S	C	BB	C	0367
1377-00-410-0292	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-410-0876	CTG, DELAY, CCU-4/A	1	FB	.0008	1.4S	C	DC	OO	0323
1377-00-411-1363	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-411-1364	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-412-3205	CTG, IMPULSE	1	FB	.0010	1.4C	C	DC	OO	0276
1377-00-419-6105	CTG, IMPULSE, PPC-13	25	FB	.0006	1.4C	C	EA	C	0276
1377-00-422-0058	VALVE	*	FB	.0003	1.4C	C	BJ	C	0173
1377-00-422-1844	INITIATOR	*	FB	.0004	1.4B	C	FB	C	0365
1377-00-422-1845	INITIATOR	*	FB	.0004	1.4B	C	FB	C	0365
1377-00-422-1846	DESTRUCT CHG	*	FB	.1000	1.4D	C	BB	C	0104
1377-00-422-1847	DESTRUCT CHG	*	FB	.0600	1.4D	C	BB	C	0104
1377-00-424-7403	CTG, KIT, BOMB	100	WB	.0003	1.4S	C	EA	C	0323
1377-00-426-0253	CATAPULT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-430-4579	COVER ASSY	1	FB	.0033	1.4S	C	BB	C	0367
1377-00-433-2324	INITIATOR, JAU-3/A25	1	FB	.0040	1.4C	C	EA	C	0276

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-299-1502	CTG IMPULSE	100	WB	.0300	1.4C	C	EA	C	0276
1377-00-299-1506	INITIATOR	1	FB	.0005	1.4C	C	BB	C	0276
1377-00-299-1510	DET CORD	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-299-1511	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-00-299-1512	INITIATOR	1	FB	.0007	1.4C	C	BB	C	0276
1377-00-299-1515	INITIATOR	1	FB	.0003	1.4C	C	BB	C	0276
1377-00-299-1516	INITIATOR	1	FB	.0006	1.4C	C	BB	C	0276
1377-00-302-1683	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-302-1684	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-1685	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-302-1752	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-302-1822	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-1829	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-302-1910	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-1936	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-1968	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-302-1974	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-1993	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-302-1994	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-2696	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-302-2697	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-302-2700	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-302-2701	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-2703	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-302-2706	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-302-2707	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-302-2715	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-302-2716	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-302-2717	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-302-2719	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-302-2720	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-302-2721	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-302-2722	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-302-2724	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-303-4296	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-303-4670	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-313-4804	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-313-4834	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-322-0778	INITIATOR	1	FB	.0005	1.4C	C	BB	C	0276
1377-00-338-6662	CATAPULT, ACFT	1	WB	12.7	1.3C	B	EM	B	0186
1377-00-349-3943	EJECT SEQUENCE SELECTOR	1	FB	.0003	1.4S	C	BB	C	0367

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-435-1405	CATAPULT, ACFT	1	WB	10.0	1.3C	B	EM	B	0186
1377-00-437-7226	THRUSTER, M26	1	FB	.0003	1.4S	C	EA	C	0323

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-488-6871	CTG, POWDER ACTUATED	*	*	.0056	1.4S	C	DC	OO	0174
1377-00-489-1527	CUTTER, CTG, ACTUATED	*	*	.0082	1.4S	C	BG	C	0070
1377-00-489-1549	GAS CONTAINER	1	FB	.0002	1.4S	X	XX	OO	0349
1377-00-489-7476	INITIATOR, DELAY	1	FB	.0022	1.4C	C	BB	C	0276
1377-00-489-9460	INITIATOR	1	FB	.0012	1.4C	C	BB	C	0276
1377-00-490-6251	CTG, IMPULSE	1	FB	.0040	1.4C	C	EA	C	0276
1377-00-491-6192	SQUIB ELECT, BBU-52/B	468	FB	.0015	1.4S	C	BE	C	0454
1377-00-492-4852	CTG, IMPULSE	100	FB	.0005	1.4C	C	DC	OO	0276
1377-00-492-7145	CATAPULT, ACFT	2	WB	10.0	1.3C	B	EM	B	0186
1377-00-492-9668	CATAPULT, ACFT	2	WB	10.0	1.3C	B	EM	B	0186
1377-00-496-9188	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-500-6877	GUN & CABLE ASSY	1	FB	.0037	1.4S	C	EA	C	0323
1377-00-512-2857	CTG, CCU-42/A	4	MC	.0002	1.4S	C	DC	OO	0349
1377-00-516-9924	CTG, IMPULSE, ARD446-1	4	MC	.0276	1.4C	C	DC	OO	0276
1377-00-517-7162	GUN & CABLE ASSY	1	FB	.0037	1.4S	C	EA	C	0323
1377-00-518-6515	CATAPULT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-528-5241	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	C	DC	OO	0174
1377-00-528-5351	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-528-5406	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	C	DC	OO	0174
1377-00-528-5415	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	C	DC	OO	0174
1377-00-528-5453	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-528-5454	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	C	DC	OO	0174
1377-00-528-5456	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-529-9301	SQUIB, ELEC, S75	500	WB	.0020	1.4S	C	BE	C	0454
1377-00-531-8659	CTG, IMPULSE	1	FB	.0003	1.4C	C	DC	OO	0276
1377-00-534-2715	CATAPULT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-534-2725	CATAPULT	2	WB	10.0	1.3C	B	EM	B	0186
1377-00-534-2733	CATAPULT	2	WB	10.0	1.3C	B	EM	B	0186
1377-00-534-2728	CATAPULT	2	WB	10.0	1.3C	B	EM	B	0186
1377-00-540-4813	CTG, IMPULSE, M37	100	FB	.1600	1.4C	C	EA	C	0276
1377-00-540-9524	CTG, IMPULSE, M73	100	FB	.0100	1.4C	C	DC	OO	0276
1377-00-542-0294	INITIATOR, M6A1	20	FB	.0080	1.4C	C	EA	C	0276
1377-00-554-1930	SQUIB, ELEC	500	WB	.0004	1.4S	C	BE	C	0454
1377-00-554-3103	THRUSTER, M25A1	4	FB	.0130	1.4S	C	EA	C	0323
1377-00-554-6647	CTG, IMPULSE, M43	200	FB	.0160	1.4C	C	DC	OO	0276
1377-00-554-6649	CTG, M46	100	FB	.0080	1.4C	C	DC	OO	0276
1377-00-559-9518	CTG, DELAY, MK86 MOD 0	1	FB	.0040	1.4S	C	DC	OO	0323
1377-00-575-8945	SEVERANCE ASSY	1	FB	.0014	1.4S	C	BB	C	0367
1377-00-580-5849	CTG, DELAY, M93	400	FB	.0120	1.4C	C	DC	OO	0276
1377-00-581-0612	PRIMER, INITIATOR	*	FB	.0001	1.4B	C	FB	C	0365
1377-00-581-0614	CABLE CUTTER	*	FB	.0011	1.4S	C	BG	C	0070

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-438-9693	GEN ASSY	1	FB	.0120	1.4C	C	EA	C	0276
1377-00-438-9694	GEN ASSY	1	FB	.0340	1.4C	C	EA	C	0276
1377-00-446-7014	CTG, IMPULSE	1	FB	.0140	1.4C	C	DC	OO	0276
1377-00-448-8898	INITIATOR	1	FB	.0004	1.4C	C	DC	OO	0276
1377-00-450-0697	BOLT, EXPL	1	FB	.0005	1.4S	C	BJ	C	0173
1377-00-453-5947	CTG, DELAY, MK136 MOD 0	4	MC	.0003	1.4S	C	DC	OO	0323
1377-00-453-5948	CTG, DELAY, MK142 MOD 0	2	MC	.0040	1.4S	C	DC	OO	0323
1377-00-453-5949	CTG, DELAY, MK141 MOD 0	2	MC	.0009	1.4S	C	DC	OO	0323
1377-00-455-7852	CATAPULT, ACFT	1	WB	10.0	1.3C	B	EM	B	0186
1377-00-460-1301	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-460-1302	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-00-463-1692	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-00-463-1693	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-463-1699	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-465-9584	CONNECTOR/MANIFOLD ASSY	1	FB	.0670	1.4S	X	XX	OO	0349
1377-00-465-9586	CONNECTOR/MANIFOLD ASSY	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-466-1808	CTG, IMPULSE, MK51 MOD 1	4	MC	.0042	1.4C	C	DC	OO	0276
1377-00-469-8513	BOLT, EXPL	•	FB	.0010	1.4S	C	BJ	C	0173
1377-00-469-8518	REEL ASSY	1	FB	.0022	1.4S	C	EA	C	0323
1377-00-470-2977	INITIATOR, JAU-9/A25	1	FB	.0040	1.4C	C	EA	C	0276
1377-00-470-3951	CORD ASSY, DET	1	FB	.0430	1.4D	C	BB	C	0289
1377-00-470-3994	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-470-3995	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-470-3996	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-470-3997	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-470-3998	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-00-470-9086	GUN & CABLE ASSY	1	FB	.0022	1.4S	C	EA	C	0323
1377-00-471-9660	CTG, IMPULSE	1	FB	.0026	1.4C	C	DC	OO	0276
1377-00-471-9661	CTG, IMPULSE	1	FB	.0622	1.4C	C	DC	OO	0276
1377-00-480-2718	CTG, FASTENER	•	•	N/A	1.4S	C	DC	OO	0174
1377-00-481-4683	GUN & CABLE ASSY	1	FB	.0024	1.4S	C	EA	C	0323
1377-00-481-7080	EXPL KIT	1	WB	.1567	1.4S	C	BB	C	0367
1377-00-481-7081	EXPL KIT	1	WB	.1869	1.4S	X	XX	OO	0349
1377-00-483-3046	CUTTER, CANOPY	1	FB	.0003	1.1D	A	AP	A	0043
1377-00-485-3930	GEN ASSY	1	FB	.0177	1.4C	C	EA	C	0276
1377-00-486-6225	SEVERANCE ASSY	1	FB	.0079	1.4S	C	BB	C	0367
1377-00-486-6226	SEVERANCE ASSY	1	FB	.0079	1.4S	C	BB	C	0367
1377-00-486-8619	CTG, IMPULSE, MK51 MOD 1	7	MC	.0042	1.4C	C	DC	OO	0276
1377-00-488-6868	CTG, POWDER ACTUATED	•	•	.0025	1.4S	C	DC	OO	0174
1377-00-488-6869	CTG, POWDER ACTUATED	•	•	.0046	1.4S	C	DC	OO	0174
1377-00-488-6870	CTG, POWDER ACTUATED	•	•	.0042	1.4S	C	DC	OO	0174

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-752-8421	REMOVER, M9	1	WB	.0919	1.3C	B	XU	B	0275
1377-00-753-2009	INITIATOR, M32	20	WB	.0110	1.4C	C	EA	C	0276
1377-00-753-2010	THRUSTER, M9	4	FB	.0070	1.4S	C	EA	C	0323
1377-00-756-0995	CTG, IMPULSE, M94	300	FB	.0300	1.4C	C	DC	OO	0276
1377-00-756-1384	CTG, ACFT, FIRE EXT	1	FB	.0009	1.4S	C	XV	C	0323
1377-00-756-1668	CTG, DELAY, M90	400	FB	.0080	1.4C	C	DC	OO	0276
1377-00-756-1669	CTG, DELAY, M114	25	FB	.0080	1.4S	C	DC	OO	0323
1377-00-756-3498	CTG, IMPULSE, M141	300	FB	.0010	1.4C	C	DC	OO	0276
1377-00-756-3499	INITIATOR, M31	20	FB	.0110	1.4C	C	EA	C	0276
1377-00-756-3501	THRUSTER, M13	4	FB	.0070	1.4S	C	EA	C	0323
1377-00-758-1986	GUN & CABLE ASSY	1	FB	.0024	1.4S	C	EA	C	0323
1377-00-758-3781	GEN, GAS PRESSURE	1	MB	.0008	1.3C	B	XU	B	0275
1377-00-761-2645	CATAPULT, ACFT	1	WP	6.5	1.3C	B	EM	B	0186
1377-00-774-7263	INITIATOR, M110	1	FB	.0040	1.4C	C	EA	C	0276
1377-00-781-8967	INITIATOR	1	FB	.0009	1.4C	C	BB	C	0276
1377-00-782-9862	INITIATOR ASSY	1	FB	.0006	1.4S	C	BB	C	0367
1377-00-782-9863	COVER ASSY	1	FB	.0066	1.4S	C	BB	C	0367
1377-00-782-9864	SEVERANCE ASSY	1	FB	.0100	1.4S	C	BB	C	0367
1377-00-790-9686	EXPL KIT, MLU-5/B	96	WB	.0105	1.4S	C	BB	C	0367
1377-00-793-9926	CTG, IMPULSE, MK19 MOD 0	96	MC	.0031	1.4C	C	DC	OO	0276
1377-00-796-6227	CAPSULE, POWDER, BOOST	1000	WB	.0004	1.3C	B	CK	B	0161
1377-00-797-0710	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-802-0293	CTG, IMPULSE, M42A1	300	FB	.0070	1.4C	C	DC	OO	0276
1377-00-804-4631	INITIATOR	1	FB	.0003	1.4C	C	BB	C	0276
1377-00-804-4643	INITIATOR	1	FB	.0009	1.4C	C	BB	C	0276
1377-00-809-0868	GEN, GAS PRESSURE	1	FB	.0220	1.4C	C	DC	OO	0276
1377-00-809-2959	INITIATOR	1	FB	.0010	1.4C	C	BB	C	0276
1377-00-824-2916	SQUIB, ELEC	1	FB	.0002	1.4S	C	XV	C	0454
1377-00-825-4910	INITIATOR	1	FB	.0030	1.4C	C	EA	C	0276
1377-00-825-4911	CTG, DELAY	1	FB	.0025	1.4S	C	DC	OO	0323
1377-00-831-3411	CUTTER, CTG, ACTUATED, M8	1	FB	.0129	1.4S	C	BG	C	0070
1377-00-845-1058	INITIATOR, M26	20	FB	.0080	1.4C	C	EA	C	0276
1377-00-845-1059	INITIATOR, M27	20	FB	.0050	1.4C	C	EA	C	0276
1377-00-845-5242	CTG SET SEAT	1	MC	.0250	1.4S	C	EA	C	0323
1377-00-849-0214	THRUSTER, M16	4	FB	.0010	1.4S	C	EA	C	0323
1377-00-850-2089	CTG, IMPULSE	1	FB	.0011	1.4S	C	DC	OO	0012
1377-00-850-2091	COVER ASSY	1	FB	.0070	1.4S	C	BB	C	0367
1377-00-850-8521	CTG, GUILLOTINE	1	FB	.0031	1.4C	C	DC	OO	0276
1377-00-850-8522	CTG, GUILLOTINE	1	FB	.0001	1.4C	C	DC	OO	0276
1377-00-850-8527	CTG, IMPULSE	1	FB	.0031	1.4C	C	DC	OO	0276
1377-00-857-9305	RKT MTR	1	WB	117.0	1.3C	B	EM	B	0186

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-581-0625	CABLE CUTTER	*	FB	.0003	1.4S	C	BG	C	0070
1377-00-581-0626	CATAPULT	1	WB	10.0	1.3C	B	EM	B	0186
1377-00-581-0628	CATAPULT	1	WB	10.0	1.3C	B	EM	B	0186
1377-00-581-0629	CATAPULT, RKT	1	WB	10.0	1.3C	B	EM	B	0186
1377-00-585-9291	CTG, IMPULSE, ARD863-1	8	MC	.0090	1.4C	C	DC	OO	0276
1377-00-596-9673	SQUIB, FIRE EXT	1	FB	.0002	1.4S	C	XV	C	0454
1377-00-602-7392	ACTUATOR, ROTARY	1	FB	.0178	1.4C	C	EA	C	0276
1377-00-607-0306	REMOVER, M4	1	FB	.0222	1.4S	C	EA	C	0323
1377-00-607-0314	THRUSTER, M15	1	FB	.0300	1.4S	C	EA	C	0323
1377-00-607-0316	THRUSTER, M5A2	4	FB	.0100	1.4S	C	EA	C	0323
1377-00-607-6052	FIRING MECHANISM	1	FB	.0309	1.4S	C	EA	C	0323
1377-00-613-0378	CTG, DELAY	1	MC	.0003	1.4S	C	DC	OO	0323
1377-00-613-0468	CATAPULT	1	WB	6.3	1.3C	B	EM	B	0186
1377-00-628-0276	FIRING MECHANISM	1	FB	.0265	1.4S	C	EA	C	0323
1377-00-628-5177	CATAPULT, M5A1	1	WB	.1960	1.4C	C	EA	C	0276
1377-00-628-5178	CATAPULT, ACFT, M3A1	1	FB	.4500	1.4C	C	EA	C	0276
1377-00-628-5179	CATAPULT, ACFT, M4A1	1	FB	.1600	1.4C	C	EA	C	0276
1377-00-628-5180	REMOVER, M1A3	1	FB	.0500	1.4S	C	EA	C	0323
1377-00-628-5181	REMOVER, M3A1	1	FB	.0536	1.4S	C	EA	C	0323
1377-00-630-9597	CTG, ACTUATOR, MK24 MOD 0	*	FB	.0003	1.4C	C	DC	OO	0276
1377-00-632-8714	CTG, IMPULSE, MK23 MOD 0	4	MC	.0002	1.4S	C	BG	C	0070
1377-00-658-3059	CTG, IMPULSE, MK14 MOD 0	1	MC	.0210	1.4C	C	DC	OO	0276
1377-00-677-6281	SQUIB, ELEC	1	FB	.0007	1.4S	C	XV	C	0454
1377-00-684-1876	CTG, IMPULSE, M119	300	FB	.0070	1.4C	C	DC	OO	0276
1377-00-684-3313	CTG, IMPULSE, M91	300	FB	.0050	1.4C	C	DC	OO	0276
1377-00-686-2266	SQUIB ASSY, ELEC	1	FB	.0001	1.4S	C	XV	C	0454
1377-00-720-2486	CTG, POWDER ACTUATED	*	*	.0177	1.4S	C	DC	OO	0174
1377-00-720-2488	CTG, POWDER ACTUATED	*	*	N/A	1.4S	C	DC	OO	0174
1377-00-720-3595	THRUSTER, M11	1	FB	.0014	1.4S	C	EA	C	0323
1377-00-723-3425	CTG, ENG STARTER, MXU-4/A	96	WB	8.0	1.4C	C	ED	C	0276
1377-00-724-9886	INITIATOR, M28	20	FB	.0050	1.4C	C	EA	C	0276
1377-00-725-7760	CTG, IMPULSE, M44A1	300	FB	.0080	1.4C	C	DC	OO	0276
1377-00-729-4635	CTG, DELAY, M150	*	*	.0120	1.4C	C	DC	OO	0276
1377-00-729-4638	CTG, DELAY, M70	300	FB	.0120	1.4C	C	DC	OO	0276
1377-00-729-6564	CTG, CANOPY REMOVER, M151	*	*	.0918	1.3C	B	XU	B	0275
1377-00-731-4496	CTG, DELAY, MK36 MOD 0	4	MC	.0004	1.4S	C	DC	OO	0012
1377-00-731-9264	CTG, IMPULSE, MK9 MOD 0	10	MC	.0187	1.4C	C	DC	OO	0276
1377-00-731-9271	INITIATOR, M99	20	FB	.0050	1.4C	C	EA	C	0276
1377-00-731-9272	INITIATOR, M53	20	FB	.0500	1.4C	C	EA	C	0276
1377-00-735-8157	CTG, IMPULSE, M146	300	FB	.0010	1.4C	C	DC	OO	0276
1377-00-741-9125	CTG, IMPULSE	1	FB	.0005	1.4C	C	BJ	C	0276

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-926-9414	INITIATOR, M45A1	20	FB	1.0	1.4C	C	EA	C	0276
1377-00-926-9415	INITIATOR, M49A1	20	FB	1.0	1.4C	C	EA	C	0276
1377-00-931-9311	CORD ASSY, DET	1	FB	.0016	1.4S	X	XX	OO	0349
1377-00-931-9339	CORD ASSY, DET	1	FB	.0002	1.4S	X	XX	OO	0349
1377-00-931-9345	CORD ASSY, DET	1	FB	.0002	1.4S	X	XX	OO	0349
1377-00-931-9346	CORD ASSY, DET	1	FB	.0013	1.4S	X	XX	OO	0349
1377-00-931-9347	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-00-932-5031	INITIATOR, M3A2	20	FB	.0009	1.4C	C	EA	C	0276
1377-00-935-9223	CATAPULT, ACFT, M37	1	FB	6.0	1.3C	B	EM	B	0186
1377-00-940-1940	REMOVER	1	FB	11.9	(04)1.2G	C	BW	C	0314
1377-00-943-6123	EXPL CUTTER	2	FB	.0020	1.4S	C	BB	C	0367
1377-00-944-1833	CUTTER, CTG, ACT	*	FB	.0013	1.4S	C	BG	C	0070
1377-00-948-8141	GUN & CABLE ASSY	1	FB	.0022	1.4S	C	EA	C	0323
1377-00-953-5567	THRUSTER, M3A3	4	FB	.0080	1.4S	C	EA	C	0323
1377-00-956-5399	CTG, GAS GEN	1	MB	5.3	1.3C	B	XU	B R	0275
1377-00-958-1048	CTG, RELEASE	2000	WB	.0006	1.4S	C	DC	OO	0323
1377-00-962-6488	GEN, GAS PRESSURE	1	MB	4.9	1.3C	B	XU	B	0275
1377-00-962-8626	CTG, DELAY, MK86 MOD 0	1	FB	.0040	1.4S	C	DC	OO	0012
1377-00-962-8695	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-966-5399	PARA KIT, MLU-14/B	4	WB	.1520	1.4S	C	EA	C	0323
1377-00-967-5163	CTG, GAS GEN	1	MB	5.3	1.3C	B	XU	B	0275
1377-00-967-5164	GEN, GAS PRESSURE	1	MB	4.9	1.3C	B	XU	B	0275
1377-00-970-5959	SEVERANCE ASSY	1	FB	.0057	1.4S	C	BB	C	0367
1377-00-970-5961	EXPL CHG	1	FB	.0147	1.4S	C	BB	C	0367
1377-00-971-6411	INITIATOR	1	FB	.0059	1.4C	C	BB	C	0276
1377-00-971-7101	SEVERANCE ASSY	1	FB	.0149	1.4S	C	BB	C	0367
1377-00-972-0353	COVER ASSY	1	FB	.0121	1.4S	C	BB	C	0367
1377-00-978-7644	CUTTER, CTG, ACT	1	FB	.0002	1.4S	C	BG	C	0070
1377-00-980-7360	MANIFOLD ASSY	1	FB	.0004	1.4B	C	BB	C	0257
1377-00-980-7375	MANIFOLD ASSY	1	FB	.0004	1.4B	C	BB	C	0257
1377-00-984-1604	CTG, IMPULSE	100	WB	.0089	1.4C	C	EA	C	0276
1377-00-984-6280	CTG, IMPULSE, MK67 MOD 0	2	MC	.0189	1.4C	C	DC	OO	0276
1377-00-987-3603	CTG, IMPULSE, MK44 MOD 0	*	FB	.0001	1.4C	C	DC	OO	0276
1377-00-988-1872	CTG, ENG STARTER, MXU-129/A	144	WB	4.0	1.3C	C	ED	C	0275
1377-00-988-1873	CATAPULT, ACFT, M9	1	WB	6.0	1.3C	B	EM	B	0186
1377-00-989-8159	CONNECTOR/MANIFOLD ASSY	1	FB	.1006	1.4S	X	XX	OO	0349
1377-00-989-8279	CONNECTOR/MANIFOLD ASSY	1	FB	.0007	1.4S	X	XX	OO	0349
1377-00-994-0011	TRANSFER ASSY	1	FB	.0008	1.4B	C	BB	C	0257
1377-00-996-5722	CTG, IMPULSE	1	MB	.0992	1.3C	B	XU	B	0275
1377-00-997-9241	INITIATOR, BAROSTAT, LOCK	1	FB	.0013	1.4C	C	BB	C	0276
1377-01-003-1175	PARTS KIT, EGRESS	1	WB	.0630	1.4S	C	BB	C	0367

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-00-859-9668	BOLT, EXPL	1	FB	1.0	1.4S	C	BJ	C	0173
1377-00-863-9387	CTG, ENG STARTER, MXU-4A/A	96	WB	8.0	1.4C	C	ED	C	0276
1377-00-864-3226	REMOVER, M8A1	1	WB	.0345	1.4S	C	EA	C	0323
1377-00-870-9296	CTG, KIT, BOMB EJECTION, MLU-12C	2	FB	.0019	1.1B	A	FA	A	0030
1377-00-872-4141	GEN, GAS PRESSURE	1	MB	30.5	1.3C	C	EA	C	0275
1377-00-872-4142	GEN, GAS PRESSURE	1	MB	41.0	1.3C	C	EA	C	0275
1377-00-883-8991	RKT MTR, MK51 MOD 0	1	WB	6.5	1.3C	B	EM	B	0186
1377-00-883-8997	CTG, IMPULSE	2	MC	.0140	1.4C	C	DC	OO	0276
1377-00-883-8998	CTG, IMPULSE	2	MC	.0030	1.4C	C	DC	OO	0276
1377-00-885-3989	INITIATOR, MK11 MOD 0	1	FB	.0004	1.4C	C	EA	C	0276
1377-00-891-5488	THRUSTER, M1A2	4	FB	.0070	1.4S	C	EA	C	0323
1377-00-891-6310	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-891-6312	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-891-6313	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-891-6314	ACTUATOR, ROTARY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-891-6315	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-891-6318	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-891-6319	ACTUATOR ASSY	1	FB	.0154	1.4C	C	EA	C	0276
1377-00-891-9573	BOOSTER, FITTING	1	FB	.0003	1.4S	C	BB	C	0367
1377-00-891-9574	BOOSTER, FITTING	1	FB	.0003	1.4S	C	BB	C	0367
1377-00-899-8874	INITIATOR, M5A2	20	FB	.0090	1.4C	C	EA	C	0276
1377-00-903-3274	INITIATOR	1	FB	.0007	1.4C	C	BB	C	0276
1377-00-917-1421	CORD ASSY, DET	1	FB	.0002	1.4S	X	XX	OO	0349
1377-00-917-8542	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-00-917-8543	CORD ASSY, DET	1	FB	.0019	1.4S	X	XX	OO	0349
1377-00-917-8557	CORD ASSY, DET	1	FB	.0024	1.4S	X	XX	OO	0349
1377-00-918-7200	CORD ASSY, DET	1	FB	.0016	1.4S	X	XX	OO	0349
1377-00-918-7488	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-00-918-8533	SQUIB ASSY, ELEC	1	FB	.0007	1.4S	C	XV	C	0454
1377-00-919-5790	CORD ASSY, DET	1	FB	.0015	1.4S	X	XX	OO	0349
1377-00-919-5791	CORD ASSY, DET	1	FB	.0015	1.4S	X	XX	OO	0349
1377-00-920-1588	CORD ASSY, DET	1	FB	.0019	1.4S	X	XX	OO	0349
1377-00-920-7347	EXPL CUTTER	1	FB	.0054	1.4S	C	BB	C	0367
1377-00-921-5048	THRUSTER, M2A2	8	FB	.0160	1.4S	C	EA	C	0323
1377-00-922-4207	SWITCH, SQUIB ACT	1	FB	.0003	1.4S	X	XX	OO	0349
1377-00-924-8892	CHG ASSY, ANTENNA	1	MB	.0061	1.4S	C	BB	C	0367
1377-00-925-3148	INITIATOR	1	MB	.0004	1.4C	C	BB	C	0276
1377-00-925-5639	REMOVER	1	WB	.0177	1.4S	C	EA	C	0323
1377-00-925-8553	SQUIB, ELEC	1	FB	.0001	1.4S	C	BE	C	0454
1377-00-926-9412	INITIATOR, M30A1	20	FB	.0110	1.4C	C	EA	C	0276
7-00-926-9413	INITIATOR, M32	20	FB	.0110	1.4C	C	EA	C	02

Table 3-1. Explosives ...zard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-015-9075	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-015-9076	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-015-9077	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-016-1415	CTG	*	*	N/A	1.4S	C	DC	C	0174
1377-01-016-1416	CTG	*	*	N/A	1.4S	C	DC	C	0174
1377-01-016-3203	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-3204	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-016-3205	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-3206	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-016-3207	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-016-3208	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-01-016-3209	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-01-016-3210	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-016-3211	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-016-3212	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-3213	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-3214	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-3215	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-3216	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-016-3217	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-016-3218	CORD ASSY, DET	1	FB	.0012	1.4S	X	XX	OO	0349
1377-01-016-3219	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-3221	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-016-3222	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-016-4161	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-016-4612	CTG	*	*	N/A	1.4S	C	DC	C	0174
1377-01-016-6724	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-0601	INITIATOR, CTG, ACT	1	FB	.0003	1.4C	C	DC	OO	0276
1377-01-017-0602	INITIATOR, CTG ACT	1	FB	.0004	1.4C	C	DC	OO	0276
1377-01-017-0612	CTG, DELAY, 0.30-SEC	1	FB	.0025	1.4S	C	DC	OO	0323
1377-01-017-0613	CTG, DELAY, 0.40-SEC	1	FB	.0025	1.4S	C	DC	OO	0323
1377-01-017-4040	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-017-4524	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-017-4525	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-017-4526	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4527	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-017-4528	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4529	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-017-4530	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4531	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-017-4532	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-003-1206	CUTTER	*	*	.0039	1.4S	C	BG	C	0070
1377-01-003-6616	RKT MTR, MK51 MOD 1	1	WB	6.5	1.3C	B	EM	B	0186
1377-01-005-2253	CUTTER, REEFING LINE	*	*	.0003	1.4S	C	BG	C	0070
1377-01-005-8621	CUTTER, REEFING LINE	*	*	.0026	1.4S	C	BG	C	0070
1377-01-007-4176	CTG, MK164 MOD 0	1	FB	.0420	1.4S	C	DC	OO	0349
1377-01-007-4740	CATAPULT	1	WB	10.0	1.3C	B	EM	B	0186
1377-01-007-4741	CATAPULT	1	WB	10.0	1.3C	B	EM	B	0186
1377-01-007-4742	CATAPULT	1	WB	10.0	1.3C	B	EM	B	0186
1377-01-007-8383	CATAPULT, M31A1	1	WB	10.0	1.3C	B	EM	B	0186
1377-01-011-6343	CATAPULT, RKT	2	WB	12.7	1.3C	B	EM	B	0186
1377-01-013-9250	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-014-2401	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-014-2402	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-014-2404	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-014-2405	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-01-014-2406	CORD ASSY, DET	1	FB	.0011	1.4S	X	XX	OO	0349
1377-01-014-2407	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-1802	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-01-015-1803	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-6422	DROGUE, GUN	1	FB	.0006	1.4S	C	EA	C	0323
1377-01-015-6490	CATAPULT, RKT	2	WB	10	1.3C	B	EM	B	0186
1377-01-015-9055	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-015-9056	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9057	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9058	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-015-9059	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9060	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9061	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-015-9062	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9063	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9064	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9065	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-015-9066	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9067	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9068	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9069	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9070	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9071	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9072	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9073	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-015-9074	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-048-6904	CABLE CUTTERS	*	*	.0051	1.4S	C	BG	C	0070
1377-01-048-9844	RELEASE BOLT	1	FB	.0012	1.4S	C	BJ	C	0173
1377-01-049-6365	CTG, IMPULSE, M796	2160	FB	.0008	1.4S	C	BE	C	0454
1377-01-049-7586	ACTUATOR ASSY, ROTARY	1	FB	.0154	1.4C	C	EA	C	0276
1377-01-050-2799	CABLE CUTTERS	*	*	.0078	1.4S	C	BG	C	0070
1377-01-052-6799	OUTPUT LINE ASSY	1	FB	.0025	1.4B	C	BB	C	0257
1377-01-052-6800	OUTPUT LINE ASSY	1	FB	.0021	1.4B	C	BB	C	0257
1377-01-052-6801	OUTPUT LINE ASSY	1	FB	.0040	1.4B	C	BB	C	0257
1377-01-052-6802	INITIATION LINE ASSY	1	FB	.0052	1.4C	C	BB	C	0276
1377-01-052-8206	CART ASSY HARNESS	1	FB	.0004	1.4C	C	EA	C	0276
1377-01-052-8207	MORTAR CTG	1	FB	.0140	1.4C	C	EA	C	0276
1377-01-052-8208	CTG ASSY	1	FB	.0019	1.4S	C	DC	OO	0014
1377-01-052-8209	REEFING LINE CUTTER	1	FB	.0024	1.4S	C	BG	C	0070
1377-01-052-8210	CUTTER LOCKING CORD	1	FB	.0024	1.4S	C	BG	C	0070
1377-01-053-0537	GAS GEN	1	FB	.0111	1.4C	C	EA	C	0276
1377-01-053-0586	RKT MTR	1	WB	1.10	1.3C	B	EM	B	0186
1377-01-053-0587	RKT MTR	1	WB	.4003	1.3C	B	XL	B	0186
1377-01-053-7833	DET TRANSFER ASSY	1	FB	.0015	1.4S	C	BB	C	0367
1377-01-053-7877	DET TRANSFER ASSY	1	FB	.0007	1.4S	C	BB	C	0367
1377-01-053-7878	DET TRANSFER ASSY	1	FB	.0016	1.4S	C	BB	C	0367
1377-01-053-7879	DET TRANSFER ASSY	1	FB	.0002	1.4S	C	BB	C	0367
1377-01-053-7880	DET TRANSFER ASSY	1	FB	.0024	1.4S	C	BB	C	0367
1377-01-053-7881	DET TRANSFER ASSY	1	FB	.0030	1.4S	C	BB	C	0367
1377-01-053-7882	DET TRANSFER ASSY	1	FB	.0019	1.4S	C	BB	C	0367
1377-01-053-7883	DET TRANSFER ASSY	1	FB	.0019	1.4S	C	BB	C	0367
1377-01-053-7884	DET TRANSFER ASSY	1	FB	.0019	1.4S	C	BB	C	0367
1377-01-053-7885	DET TRANSFER ASSY	1	FB	.8256	1.4S	C	BB	C	0367
1377-01-053-7888	DET TRANSFER ASSY	1	FB	.0019	1.4S	C	BB	C	0367
1377-01-053-7889	DET TRANSFER ASSY	1	FB	.0036	1.4S	C	BB	C	0367
1377-01-053-7891	DET TRANSFER ASSY	1	FB	.0018	1.4S	C	BB	C	0367
1377-01-053-7892	DET TRANSFER ASSY	1	FB	.0036	1.4S	C	BB	C	0367
1377-01-054-2911	INITIATOR	1	FB	.0006	1.4C	C	BB	C	0276
1377-01-054-2912	INITIATOR	1	FB	.0006	1.4C	C	BB	C	0276
1377-01-054-9949	INITIATOR	1	FB	.0030	1.4S	C	BB	C	0367
1377-01-054-9950	DET TRANSFER ASSY	1	FB	.0007	1.4S	C	BB	C	0367
1377-01-055-8621	DET TRANSFER ASSY	1	FB	.0024	1.4S	C	BB	C	0367
1377-01-055-8622	DET TRANSFER ASSY	1	FB	.0017	1.4S	C	BB	C	0367
1377-01-055-8623	DET TRANSFER ASSY	1	FB	.0016	1.4S	C	BB	C	0367
1377-01-055-8624	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367
1377-01-055-8626	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367
1377-01-055-8627	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-017-4533	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4534	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4535	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-017-4536	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-017-4537	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4538	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4539	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-017-4540	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-01-018-2110	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-01-018-2111	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-018-8721	SHIELDED MILD DET CORD	1	FB	.0010	1.4S	X	XX	OO	0349
1377-01-020-0519	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-020-0520	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-020-0521	SHIELDED MILD DET CORD	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-021-9574	CATAPULT, RKT	2	WB	12.7	1.3C	B	EM	B	0186
1377-01-027-0137	CORD ASSY, DET	3	FB	.0006	1.4S	X	XX	OO	0349
1377-01-029-7385	CATAPULT, RKT	1	WB	10.0	1.3C	B	EM	B	0186
1377-01-029-7386	CATAPULT, RKT	2	WB	10.0	1.3C	B	EM	B	0186
1377-01-030-3828	INITIATOR, CTG, ACT	*	FB	.0077	1.4C	C	EA	C	0276
1377-01-031-4938	CUTTER, REEFING LINE	*	*	.0039	1.4S	X	XX	OO	0349
1377-01-031-9084	CORD ASSY, DET	3	FB	.0006	1.4S	X	XX	OO	0349
1377-01-033-0269	INITIATOR, PROPELLANT ACT, JAU-16/ A25	1	FB	.8000	1.4C	C	EA	C	0276
1377-01-033-3361	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-034-9804	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-036-6598	RKT, DIVERGENCE	2	WB	.6400	1.3C	B	EM	B	0186
1377-01-036-8514	RKT MTR, MK92	1	WB	6.5	1.3C	B	EM	B	0186
1377-01-037-8538BT	CTG FIRE EXT	1	FB	.0007	1.4S	C	XV	C	0454
1377-01-037-8572	CORD ASSY, DET	3	FB	.0007	1.4S	X	XX	OO	0349
1377-01-037-8573	CORD ASSY, DET	3	FB	.0007	1.4S	X	XX	OO	0349
1377-01-037-8650	CTG, IMPULSE, BBU-36/B	2160	FB	.0022	1.4S	C	BE	C	0454
1377-01-037-8651	CTG, IMPULSE, BBU-35/B	240	FB	.0008	1.4S	C	BE	C	0454
1377-01-038-7209	GAS GEN, MK7 MOD 1	*	*	.7717	1.4C	C	EA	C	0276
1377-01-043-8275	CTG FIRE EXT	*	*	.0009	1.4S	C	XV	C	0323
1377-01-044-6367	FIRE EXT, CART	1	FB	.0007	1.4S	C	XV	C	0454
1377-01-045-7095	CATAPULT, RKT	2	WB	12.7	1.3C	B	EM	B	0186
1377-01-046-7782	INITIATOR, PRESSURE BOOST	1	FB	.0066	1.4C	C	EA	C	0276
1377-01-046-7783	INITIATOR, PRESSURE BOOST	1	FB	.0100	1.4C	C	EA	C	0276
1377-01-047-3523	INITIATOR, SEAT, 0.75-SEC	1	FB	.0066	1.4C	C	EA	C	0276
1377-01-047-7458	INITIATOR, TRIGGER	1	FB	.0066	1.4C	C	EA	C	0276
1377-01-048-6903	CABLE CUTTERS	*	*	.0052	1.4S	C	BG	C	0070

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-060-8545	DET CORD	1	*	.0022	1.4S	C	XZ	C	0104
1377-01-060-8546	CART INITIATOR	1	*	.0002	1.4S	C	EA	C	0323
1377-01-061-2268	DET TRANSFER ASSY	1	FB	.0012	1.4S	C	BB	C	0367
1377-01-061-5737	CORD DET SET	N/A	N/A	.0227	1.4D	C	YR	C	0289
1377-01-061-5738	CATAPULT, CKU-8/A	1	WB	.1960	1.4C	C	EA	C	0276
1377-01-061-5749	CTG, IMPULSE, CCU-52/B	1	MC	.1660	1.4C	C	DC	OO	0276
1377-01-061-5751	CTG, CCU-56/A	1	FB	.1960	1.4C	C	EA	C	0276
1377-01-063-2198	INITIATOR	1	FB	.0005	1.4C	C	BB	C	0276
1377-01-063-3161	CTG, IMPULSE, CCU-44/B	60	MB	.0100	1.4C	C	DC	OO	0276
1377-01-063-3163	CTG, IMPULSE	10	FB	.0233	1.4C	C	DC	OO	0276
1377-01-063-3164	CTG, IMPULSE	80	WB	.0100	1.4C	C	DC	OO	0276
1377-01-063-3165	CTG, IMPULSE	10	FB	.0100	1.4C	C	DC	OO	0276
1377-01-063-3166	CTG, IMPULSE	80	WB	.0206	1.4C	C	DC	OO	0276
1377-01-063-3167	CTG, IMPULSE	10	FB	.0206	1.4C	C	DC	OO	0276
1377-01-063-3168	CTG, IMPULSE	80	WB	.0233	1.4C	C	DC	OO	0276
1377-01-063-9732	DET TRANSFER ASSY	1	FB	.0031	1.4S	C	BB	C	0367
1377-01-063-9733	DET TRANSFER ASSY	1	FB	.0030	1.4S	C	BB	C	0367
1377-01-065-7233	DET TRANSFER ASSY	1	FB	.0040	1.4S	C	BB	C	0367
1377-01-065-7234	DET TRANSFER ASSY	1	FB	.0040	1.4S	C	BB	C	0367
1377-01-066-2664	CUTTER, MLU-40A/B	1	FB	.0060	1.4S	C	BB	C	0367
1377-01-069-7770	DET TRANSFER ASSY	1	FB	.0006	1.4S	X	XX	OO	0384
1377-01-069-7771	DET, ELEC	1	FB	.0006	1.4S	X	XX	OO	0366
1377-01-069-7772	WARHEAD ADAPTER ASSY	1	FB	.0090	1.4B	C	BB	C	0257
1377-01-069-7776	EXPL CORD SET	1	FB	.0145	1.4S	X	XX	OO	0349
1377-01-069-7777	EXPL CORD SET	1	FB	.0461	1.4S	X	XX	OO	0349
1377-01-073-2190	INITIATOR	1	FB	.0098	1.4C	C	EA	C	0276
1377-01-073-2193	DET TRANSFER ASSY	1	FB	.0016	1.4S	C	BB	C	0367
1377-01-073-2194	DET TRANSFER ASSY	1	FB	.0017	1.4S	C	BB	C	0367
1377-01-073-3831	REFIRE KIT, HH-60	1	FB	.0003	1.4S	C	EA	C	0323
1377-01-073-9444	RELEASE LINE	1	FB	.0082	1.4S	C	BB	C	0367
1377-01-073-9445	RELEASE LINE	1	FB	.0082	1.4S	C	BB	C	0367
1377-01-075-6433	CTG ACTUATED RELEASE ASSY, M5	N/A	N/A	.0033	1.4C	C	EA	C	0276
1377-01-079-2661	DET TRANSFER ASSY	1	FB	.0036	1.4S	C	BB	C	0367
1377-01-079-2662	DET TRANSFER ASSY	1	FB	.0036	1.4S	C	BB	C	0367
1377-01-079-2663	DET TRANSFER ASSY	1	FB	.0040	1.4S	C	BB	C	0367
1377-01-079-2664	DET TRANSFER ASSY	1	FB	.0040	1.4S	C	BB	C	0367
1377-01-079-5328	DET TRANSFER ASSY	1	FB	.0017	1.4S	C	BB	C	0367
1377-01-080-3963	INITIATOR	N/A	N/A	.0001	1.4S	C	XV	C	0323
1377-01-080-8252	CART ENG START, MXU-4A/A	4	FB	8.0	1.4C	C	ED	C	0276
1377-01-081-2993	CTG, IMPULSE, CCU-61/A	*	*	.0003	1.4C	C	DC	OO	0276
1377-01-082-4026	DET TRANSFER ASSY	1	FB	.0018	1.4S	C	BB	C	0367

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-055-8628	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367
1377-01-055-9964	DET TRANSFER ASSY	1	FB	.0067	1.4S	C	BB	C	0367
1377-01-056-0821	RKT CATAPULT, MK16 MOD 1	1	WB	9.0	1.3C	B	EM	B	0186
1377-01-056-4520	DET TRANSFER ASSY	1	FB	.0011	1.4S	C	BB	C	0367
1377-01-056-4521	DET TRANSFER ASSY	1	FB	.0011	1.4S	C	BB	C	0367
1377-01-056-4522	DET TRANSFER ASSY	1	FB	.0027	1.4S	C	BB	C	0367
1377-01-056-4523	DET TRANSFER ASSY	1	FB	.0027	1.4S	C	BB	C	0367
1377-01-056-4524	DET TRANSFER ASSY	1	FB	.0017	1.4S	C	BB	C	0367
1377-01-056-4525	DET TRANSFER ASSY	1	FB	.0012	1.4S	C	BB	C	0367
1377-01-056-4526	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367
1377-01-056-4527	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367
1377-01-056-4528	DET TRANSFER ASSY	1	FB	.0043	1.4S	C	BB	C	0367
1377-01-056-4529	DET TRANSFER ASSY	1	FB	.0043	1.4S	C	BB	C	0367
1377-01-056-4530	DET TRANSFER ASSY	1	FB	.0018	1.4S	C	BB	C	0367
1377-01-056-4531	DET TRANSFER ASSY	1	FB	.0017	1.4S	C	BB	C	0367
1377-01-056-4536	CTG DELAY	100	WB	.0002	1.4S	C	DC	OO	0323
1377-01-056-8642	LINE ASSY, DET	1	FB	.0067	1.4S	C	BB	C	0367
1377-01-056-8643	RELEASE LINE	1	FB	.0083	1.4S	C	BB	C	0367
1377-01-056-8644	LINE ASSY, DET	1	FB	.0083	1.4S	C	BB	C	0367
1377-01-056-8645	INITIATOR	1	FB	.0098	1.4C	C	EA	C	0276
1377-01-057-0685	CTG, IMPULSE, ARD 446-1	4	FB	.0276	1.4C	C	DC	OO	0276
1377-01-057-0686	CTG, IMPULSE, ARD 863-1	8	FB	.0090	1.4C	C	DC	OO	0276
1377-01-057-1176	CTG, IMPULSE, MK51 MOD 0	4	FB	.0042	1.4C	C	DC	OO	0276
1377-01-057-5430	CTG, IMPULSE, CCU-1/B	4	FB	.0139	1.4C	C	DC	OO	0276
1377-01-057-5431	REMOVER	1	FB	.6879	1.3C	B	EM	B	0186
1377-01-058-0122	REMOVER	1	FB	.6879	1.3C	B	EM	B	0186
1377-01-058-7367	CTG, IMPULSE, MK2 MOD 1	4	FB	.0139	1.4C	C	DC	OO	0276
1377-01-059-0805	FLSC HOLDER ASSY	1	FB	.0011	1.4D	C	BB	C	0237
1377-01-059-0806	TRANSFER LINE ASSY	1	FB	.0084	1.4B	C	BB	C	0257
1377-01-059-0807	TRANSFER LINE ASSY	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-060-8532	DET CORD	1	*	.0031	1.4D	C	BB	C	0289
1377-01-060-8533	DET CORD	1	*	.0018	1.4D	C	BB	C	0289
1377-01-060-8534	DET CORD	1	*	.0009	1.4D	C	BB	C	0289
1377-01-060-8535	DET CORD	1	*	.0037	1.4D	C	BB	C	0289
1377-01-060-8536	DET CORD	1	*	.0029	1.4D	C	BB	C	0289
1377-01-060-8537	DET CORD	1	*	.0044	1.4D	C	BB	C	0289
1377-01-060-8539	DET CORD	1	*	.0015	1.4D	C	FC	C	0237
1377-01-060-8540	DET CORD	1	*	.0013	1.4D	C	FC	C	0237
1377-01-060-8541	DET CORD	1	*	.0022	1.4D	C	FC	C	0237
1377-01-060-8543	DET CORD	1	*	.0007	1.4S	C	XZ	C	010
1377-01-060-8544	DET CORD	1	*	.0018	1.4S	C	XZ	C	01(

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-082-9453	PRESSURE CTG	N/A	N/A	.0004	1.4C	C	XG	C	0276
1377-01-083-5091	CATAPULT RKT	1	WB	6.4	1.3C	B	EM	B	0186
1377-01-083-8459	FLSC HOLDER ASSY	*	FB	.0011	1.4D	C	BB	C	0237

Table 3-1. Explosives ard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-115-3850	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367
1377-01-115-3851	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367
1377-01-116-3197	IGNITION DEVICE, PVU-2A	N/A	N/A	.0001	1.4S	C	CE	C	0044
1377-01-119-4586	INITIATOR	*	*	.0020	1.4S	X	XX	OO	0349
1377-01-119-4587	FLEXIBLE CONFINED DET CORD	*	*	.0019	1.4S	X	XX	OO	0349
1377-01-119-4588	FLEXIBLE CONFINED DET CORD	*	*	.0007	1.4S	X	XX	OO	0349
1377-01-120-1867	SLEEVE & GRAIN ASSY	N/A	N/A	6.7	1.3C	B	CK	B	0274
1377-01-125-2127	BOOSTER, FUZE, MK35 MOD 0	1	WB	.0072	1.1D	A	AP	A	0042
1377-01-125-9407	PRESSURE ACTIVATED EXPL DEVICE	*	FB	.0002	1.4C	C	EA	C	0276
1377-01-125-9500	SHIELDED MILD DET CORD	N/A	N/A	.0142	1.4D	C	FC	C	0237
1377-01-125-9501	SHIELDED MILD DET CORD	N/A	N/A	.0142	1.4D	C	FC	C	0237
1377-01-125-9502	SHIELDED MILD DET CORD	N/A	N/A	.0116	1.4D	C	FC	C	0237
1377-01-125-9503	SHIELDED MILD DET CORD	N/A	N/A	.0116	1.4D	C	FC	C	0237
1377-01-125-9504	SHIELDED MILD DET CORD	N/A	N/A	.0113	1.4D	C	FC	C	0237
1377-01-125-9505	SHIELDED MILD DET CORD	N/A	N/A	.0124	1.4D	C	FC	C	0237
1377-01-125-9506	SHIELDED MILD DET CORD	N/A	N/A	.0124	1.4D	C	FC	C	0237
1377-01-126-7690	GAS GEN	*	FB	.0159	1.4C	C	EA	C	0276
1377-01-128-8405	ELEC DET	N/A	N/A	.0007	1.4B	C	BB	C	0257
1377-01-132-7478	CABLE CUTTER	1	FB	.0003	1.4S	C	BG	C	0070
1377-01-133-1957	CABLE CUTTER	1	FB	.0003	1.4S	C	BG	C	0070
1377-01-137-6037	INITIATOR	*	FB	.0118	1.4C	C	EA	C	0276
1377-01-137-6038	INITIATOR	*	FB	.0016	1.4C	C	EA	C	0276
1377-01-137-6039	INITIATOR, 1.0 SEC DELAY	*	FB	.0070	1.4C	C	EA	C	0276
1377-01-137-6040	INITIATOR, .30 SEC DELAY	*	FB	.0031	1.4C	C	EA	C	0276
1377-01-137-6041	CATAPULT	N/A	N/A	.2488	1.4C	C	EA	C	0276
1377-01-137-6052	RKT MTR	1	WB	2.7	1.3C	B	EM	B	0186
1377-01-138-1551	DROGUE GUN	1	FB	.0033	1.4S	C	EA	C	0323
1377-01-138-1552	DROGUE GUN	1	FB	.0033	1.4S	C	EA	C	0323
1377-01-139-2835	DET TRANSFER ASSY	1	FB	.0015	1.4S	C	BB	C	0367
1377-01-140-4251	CUTTER, CTG, ACT, 16 SEC DELAY	100	FB	.0001	1.4S	C	BG	C	0070
1377-01-140-4415	DET TRANSFER ASSY	1	FB	.0007	1.4S	C	BB	C	0367
1377-01-141-2968	QF 100 SHIP SET	1	WB	7.4	1.3C	B	EM	B	0186
1377-01-141-8911	REEL ASSY INERTIA	1	FB	.0077	1.4S	C	EA	C	0323
1377-01-144-8481	DET TRANSFER ASSY	1	FB	.0043	1.4S	C	BB	C	0367
1377-01-144-8482	DET TRANSFER ASSY	1	FB	.0043	1.4S	C	BB	C	0367
1377-01-156-4139	CABLE CUTTER	1	FB	.0004	1.4S	C	BG	C	0070
1377-01-160-6506	DET TRANSFER ASSY	1	FB	.0006	1.4S	C	BB	C	0367
1377-01-165-2080	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-01-166-1350	CART DELAY, .5 SEC	N/A	N/A	.0005	1.4S	C	DC	OO	0012
1377-01-166-4149	WARHEAD ADAPTER ASSY	1	FB	.0088	1.4B	C	BB	C	0257
1377-01-166-4261	INITIATOR	1	FB	.0069	1.4C	C	EA	C	0276

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-084-6047	CTG, IMPULSE, CCU-58/A	*	*	.0030	1.4C	C	DC	OO	0276
1377-01-084-9358	CTG, BOOSTER	*	*	.0001	1.4S	C	DC	OO	0014
1377-01-085-5974	RELEASE BOLT	1	FB	.0018	1.4S	C	BJ	C	0173
1377-01-087-2190	DET TRANSFER ASSY	1	FB	.0036	1.4S	C	BB	C	0367
1377-01-087-5166	CTG CUTTER, HH-60	1	FB	.0003	1.4S	C	BG	C	0070
1377-01-088-2321	CATAPULT RKT	1	WB	12.7	1.3C	B	EM	B	0186
1377-01-088-3615	DET TRANSFER ASSY	1	FB	.0036	1.4S	C	BB	C	0367
1377-01-088-5534	ACTUATOR	1	FB	.0155	1.4C	C	EA	C	0276
1377-01-089-0127	CATAPULT RKT	1	WB	12.7	1.3C	B	EM	B	0186
1377-01-089-2859	CTG, CCU-1/B	12	FB	.0139	1.4C	C	DC	OO	0276
1377-01-089-2860	CTG, MK17 MOD 1	12	FB	.0031	1.4C	C	DC	OO	0276
1377-01-089-2861	CTG, RELEASE	10	FB	.0060	1.4S	C	DC	OO	0323
1377-01-089-6201	ACTUATOR KIT	1	FB	.0018	1.4S	X	XX	OO	0349
1377-01-089-6216	KIT PARTS CORD ASSY	N/A	N/A	.0309	1.4D	C	BB	C	0289
1377-01-090-7557	CTG, DELAY 4 SEC	*	*	.0002	1.4S	C	DC	OO	0012
1377-01-091-8222	CATAPULT RKT	1	WB	12.7	1.3C	B	EM	B	0186
1377-01-092-5691	CUTTER	2	FB	.0080	1.4S	C	BB	C	0367
1377-01-093-9551	PRIMER, CAL .50	N/A	N/A	N/A	1.4B	C	DE	C	0378
1377-01-094-6899	CUTTER ASSY	1	MB	.0009	1.4S	C	BG	C	0070
1377-01-094-7054	INITIATOR, JAU-20/A	1	FB	.0010	1.4S	C	DC	OO	0349
1377-01-096-7537	CTG, IMPULSE	1	FB	.0010	1.4C	C	DC	OO	0276
1377-01-099-8087	DET TRANSFER ASSY	1	FB	.0019	1.4S	C	BB	C	0367
1377-01-099-8088	DET TRANSFER ASSY	1	FB	.0019	1.4S	C	BB	C	0367
1377-01-099-8089	DET TRANSFER ASSY	1	FB	.0018	1.4S	C	BB	C	0367
1377-01-102-2219	INITIATOR	1	FB	.0098	1.4C	C	EA	C	0276
1377-01-102-8963	INITIATOR	1	FB	.0098	1.4C	C	EA	C	0276
1377-01-103-3350	GAS GEN	1	FB	.0250	1.4C	C	EA	C	0276
1377-01-103-9120	CTG, IMPULSE, CCU-41/B	240	WB	.0006	1.4S	C	DC	OO	0432
1377-01-104-2309	CTG ASSY	N/A	N/A	N/A	1.4C	C	XG	C	0276
1377-01-104-8595	INITIATOR, DELAY	1	FB	.0069	1.4C	C	EA	C	0276
1377-01-105-6372	FLEXIBLE CONFINED DET CORD	*	*	.0018	1.4S	X	XX	OO	0349
1377-01-108-1438	IGNITION DEVICE	N/A	N/A	.0001	1.4S	C	CE	OO	0432
1377-01-110-6564	GAS GEN	1	FB	.0340	1.4C	C	EA	C	0276
1377-01-110-7306	CTG ACTUATED INIT, JAU-22/B	48	WB	.0130	1.4C	C	EA	C	0276
1377-01-111-6840	DET TRANSFER ASSY	1	FB	.0019	1.4S	C	BB	C	0367
1377-01-112-6951	DET TRANSFER ASSY	1	FB	.0017	1.4S	C	BB	C	0367
1377-01-112-6952	DET TRANSFER ASSY	1	FB	.0017	1.4S	C	BB	C	0367
1377-01-112-6953	DET TRANSFER ASSY	1	FB	.0016	1.4S	C	BB	C	0367
1377-01-112-6954	DET TRANSFER ASSY	1	FB	.0010	1.4S	C	BB	C	0367

Table 3-1. Explosive Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-203-9713	DET TRANSFER ASSY	1	FB	.0015	1.4S	C	BB	C	0367
1377-01-207-7089	INITIATOR ASSY (TYPE IV)	*	FB	.0020	1.4S	C	BB	C	0367
1377-01-207-7090	INITIATOR ASSY (TYPE III)	*	FB	.0005	1.4S	C	BB	C	0367
1377-01-207-7091	INITIATOR ASSY (TYPE II)	*	FB	.0005	1.4S	C	BB	C	0367
1377-01-208-1090	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-208-1091	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-208-8646	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-209-3847	INITIATOR ASSY (TYPE I)	*	FB	.0020	1.4S	C	BB	C	0367
1377-01-211-7211	CTG, IMPULSE, CCU-92/A	1	MB	.0004	1.4C	C	DC	OO	0276
1377-01-211-7212	THRUSTER, CTG ACTUATED	1	MB	.0004	1.4S	C	EA	C	0323
1377-01-212-8583	CTG, IMPULSE	1	FB	.0003	1.4C	C	BE	C	0276
1377-01-213-3090	GEN, GAS	*	*	.0077	1.4S	C	DC	OO	0012
1377-01-216-4889	CTG, .75 SEC DELAY	*	FB	.0005	1.4S	C	DC	OO	0012
1377-01-216-5958	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-216-5959	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-216-5960	CORD ASSY, DET	1	FB	.0003	1.4B	C	BB	C	0257
1377-01-216-5961	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-216-5962	CORD ASSY, DET	1	FB	.0022	1.4B	C	BB	C	0257
1377-01-216-5963	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-216-5964	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-216-6090	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-216-6091	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-216-6979	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-216-6980	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-217-0276	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-217-3309	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-217-3310	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-217-3311	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-217-3312	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-217-3313	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-218-0335	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-218-0336	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-218-0337	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-218-0338	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-218-0339	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-218-0340	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-218-0341	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-218-0342	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-218-0343	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-218-0344	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-218-0345	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-166-4262	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-01-166-4263	INITIATOR	N/A	N/A	.0005	1.4C	C	BB	C	0276
1377-01-166-4264	INITIATOR	N/A	N/A	.0009	1.4C	C	BB	C	0276
1377-01-166-4265	INITIATOR	N/A	N/A	.0014	1.4C	C	BB	C	0276
1377-01-166-4266	INITIATOR	1	FB	.0005	1.4C	C	BB	C	0276
1377-01-167-6621	INITIATOR	1	FB	.0003	1.4C	C	BB	C	0276
1377-01-168-2559	CART DELAY, .25 SEC	N/A	N/A	.0005	1.4S	C	DC	OO	0012
1377-01-168-4419	CART DELAY, 1.0 SEC	N/A	N/A	.0005	1.4S	C	DC	OO	0012
1377-01-169-7797	CATAPULT RKT CKU-5A/A	1	WB	5.5	1.3C	B	EM	B	0186
1377-01-173-3074	CTG, GAS GEN	1	MB	5.3	1.3C	B	XU	B	0275
1377-01-178-6691	CTG, DELAY, CCU-89/A	10	FB	.0006	1.4S	C	DC	OO	0323
1377-01-180-3094	SHIELDED MILD DET CORD	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-184-1177	CTG, DELAY, CCU-88/A	2	MC	.0004	1.4S	C	DC	OO	0323
1377-01-184-1178	CTG, DELAY, CCU-87/A	2	MC	.0009	1.4S	C	DC	OO	0323
1377-01-184-4667	CTG, DELAY, CCU-86/A	2	MC	.0003	1.4S	C	DC	OO	0323
1377-01-185-2622	CTG, FIRE EXTINGUISHER	*	FB	.0031	1.4S	C	XV	C	0323
1377-01-198-7480	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-198-7481	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-198-7482	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-198-7483	DET TRANSFER ASSY	1	FB	.0005	1.4S	C	BB	C	0367
1377-01-198-7484	DET TRANSFER ASSY	1	FB	.0005	1.4S	C	BB	C	0367
1377-01-198-7485	DET TRANSFER ASSY	1	FB	.0005	1.4S	C	BB	C	0367
1377-01-200-2429	DET TRANSFER ASSY	1	FB	.0015	1.4S	C	BB	C	0367
1377-01-200-9008	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9009	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9010	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9011	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9012	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9013	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9014	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9015	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-200-9016	DET TRANSFER ASSY	1	FB	.0005	1.4S	C	BB	C	0367
1377-01-200-9017	DET TRANSFER ASSY	1	FB	.0005	1.4S	C	BB	C	0367
1377-01-200-9018	DET TRANSFER ASSY	1	FB	.0005	1.4S	C	BB	C	0367
1377-01-200-9019	DET TRANSFER ASSY	1	FB	.0005	1.4S	C	BB	C	0367
1377-01-201-5515	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-202-9195	CTG, IMPULSE	1	FB	.0529	1.4C	C	EA	C	0276
1377-01-203-1959	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-01-203-1960	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-01-203-1961	INITIATOR	1	FB	.0005	1.4C	C	BB	C	0276
1377-01-203-8651	INITIATOR	*	FB	.0006	1.4C	C	BB	C	0276

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-218-0346	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-218-0347	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-218-0348	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-218-0349	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-218-0350	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-218-0351	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-218-3964	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-218-7719	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-218-7720	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-218-7721	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-218-7722	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-218-7723	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-218-7724	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-218-7838	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-218-8633	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-218-8634	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-230-8640	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-230-8641	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-230-9490	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-230-9491	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-230-9492	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-230-9493	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-230-9494	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-230-9495	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-230-9496	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-230-9497	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-230-9498	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-230-9499	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-230-9500	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-230-9501	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-230-9502	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-230-9503	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-230-9504	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-230-9505	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-230-9506	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-230-9507	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-231-0826	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-0827	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-0828	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-231-0829	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-231-0830	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-231-0831	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-231-0832	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-0833	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-0834	CORD ASSY, DET	1	FB	.0023	1.4B	C	BB	C	0257
1377-01-231-0835	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-231-0836	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-0837	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-231-0838	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-0839	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-0840	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-0841	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-0842	CORD ASSY, DET	1	FB	.0025	1.4B	C	BB	C	0257
1377-01-231-0843	CORD ASSY, DET	1	FB	.0023	1.4B	C	BB	C	0257
1377-01-231-0844	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-0845	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-0846	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-229-5805	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-229-5806	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-5807	CORD ASSY, DET	1	FB	.0023	1.4B	C	BB	C	0257
1377-01-229-5808	CORD ASSY, DET	1	FB	.0023	1.4B	C	BB	C	0257
1377-01-229-5809	CORD ASSY, DET	1	FB	.0024	1.4B	C	BB	C	0257
1377-01-229-5810	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-229-5811	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-5812	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-229-5813	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-229-7648	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-229-7649	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-229-7650	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-229-7651	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-7652	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-229-7653	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-229-7654	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-229-7655	CORD ASSY, DET	1	FB	.0022	1.4B	C	BB	C	0257
1377-01-229-7656	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-229-7657	CORD ASSY, DET	1	FB	.0022	1.4B	C	BB	C	0257
1377-01-229-7658	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-229-7659	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-229-7660	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-229-7661	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-229-7662	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-229-7663	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-229-7664	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-229-7665	CORD ASSY, DET	1	FB	.0025	1.4B	C	BB	C	0257
1377-01-229-7666	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-229-7667	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-230-5023	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-230-5999	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-230-6000	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-230-8631	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-230-8632	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-230-8633	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-230-8634	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-230-8635	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-230-8636	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-230-8637	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-230-8638	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-230-8639	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-231-0847	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-0848	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-231-0849	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-0850	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-231-0851	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-0852	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-231-1049	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-1050	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-1051	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1052	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-1053	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-1054	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-1055	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1056	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1057	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-231-1058	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-231-1059	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1060	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-231-1061	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-231-1062	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-231-1063	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-231-1064	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-1065	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-1066	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-231-1067	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1068	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-231-1069	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-231-1070	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-231-1071	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-231-1072	LINE ASSY, TRANSFER	1	FB	.0004	1.4B	C	BB	C	0257
1377-01-231-1073	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1074	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1075	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-231-1076	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-231-1077	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-231-1078	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-1079	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-231-1080	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-231-1081	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-231-1082	CORD ASSY, DET	1	FB	.0023	1.4B	C	BB	C	0257
1377-01-231-1083	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-231-1084	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-231-1085	CORD ASSY, DET	1	FB	.0024	1.4B	C	BB	C	0257
1377-01-231-1086	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-231-6377	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-231-6378	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-231-6379	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-4168	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-4169	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-4170	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-232-4171	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-4172	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-4173	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-232-4174	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-4175	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-4176	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-232-4177	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-4178	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-4179	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-4180	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-4181	CORD ASSY, DET	1	FB	.0024	1.4B	C	BB	C	0257
1377-01-232-4182	CORD ASSY, DET	1	FB	.0024	1.4B	C	BB	C	0257
1377-01-232-4183	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-6296	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6297	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-232-6298	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-232-6299	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-6300	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-6301	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-232-6302	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-232-6303	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6304	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6305	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6306	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-6307	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-6308	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-6309	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-232-6310	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-232-6311	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-6312	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-6313	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6314	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		=RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-232-6316	INITIATOR	*	FB	.0400	1.4S	C	BE	C	0454
1377-01-232-6320	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-6384	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-6385	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-6386	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-232-6387	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6388	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-6389	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-232-6390	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-6391	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-6392	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-6393	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6394	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-6395	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-6396	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6397	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-6398	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-6399	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-6400	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-6401	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-6402	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-6403	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-6404	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-232-6405	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-232-6406	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-6407	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-232-6408	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-232-6409	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-232-6410	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-6411	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6412	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-6413	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-8258	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-8259	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8260	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-8261	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8262	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-8263	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-232-8264	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-8265	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-232-8266	CORD ASSY, DET	1	FB	.0022	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-232-8267	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-8268	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-8269	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-8270	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-8271	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-232-8272	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-232-8273	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-8274	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8275	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-232-8276	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-232-8277	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-232-8278	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-8279	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8280	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-232-8281	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-8282	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8283	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-8284	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-232-8285	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-232-8286	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-8287	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-232-8288	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8289	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-8290	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-232-8291	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-8292	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8293	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-232-8294	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-232-8295	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-232-8296	CORD ASSY, DET	1	FB	.0019	1.4B	C	BB	C	0257
1377-01-232-8297	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-232-8298	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-232-8299	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-232-9360	CORD ASSY, DET	1	FB	.0023	1.4B	C	BB	C	0257
1377-01-232-9361	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-0280	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-0982	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-233-2238	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-233-2239	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-233-2240	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-233-2241	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257

Pages 3-74A through 3-74D are deleted in their entirety.

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-233-2242	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2243	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2244	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-233-2245	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-233-2246	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-233-2247	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2248	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2249	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-233-2250	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-233-2251	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-233-2252	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-233-2253	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-233-2254	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-233-2255	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2256	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2257	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-233-2258	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2259	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2260	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-233-2261	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-233-2262	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-233-2263	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-233-2264	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-233-2643	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2644	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-233-2645	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2646	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-233-2647	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2648	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2649	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-233-2650	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-233-2651	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2652	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2653	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2654	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-233-2655	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2656	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2657	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2658	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2659	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-233-2660	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-233-2661	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-233-2662	CORD ASSY, DET	1	FB	.0028	1.4B	C	BB	C	0257
1377-01-233-2663	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2664	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2665	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2666	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2667	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2668	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-233-2669	CORD ASSY, DET	1	FB	.0022	1.4B	C	BB	C	0257
1377-01-233-2670	CORD ASSY, DET	1	FB	.0021	1.4B	C	BB	C	0257
1377-01-233-2671	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-233-2672	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2673	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2674	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-233-2675	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2676	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2677	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2678	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2679	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-233-2680	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2681	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-233-2682	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-233-2683	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-233-2684	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-233-2685	CORD ASSY, DET	1	FB	.0017	1.4B	C	BB	C	0257
1377-01-233-2686	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-233-2687	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2688	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2689	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-233-2690	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2691	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-233-2692	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-233-2693	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-233-2694	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-233-2695	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-233-2696	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-233-2697	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-233-2698	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1325-00-028-5264	BOMB, G.P., M117	2	PL	386.0	1.1D	EX-8806564	0034
1325-00-028-5273	BOMB, G.P., M118	1	PL	1917	1.1D	EX-8810611	0034
1325-00-028-5401	ADAPTER BOOSTER, T45	8	WB	0.4328	1.1D	EX-8810619	0042
1325-00-028-5461	FUZE, BOMB, M152A1	15	WB	.0027	1.1D	EX-8806567	0408
1325-00-028-5465	FUZE, MECH TIME, M147A1	15	WB	.0027	1.4D	EX-8810620	0410
1325-00-028-5494	FUZE, BOMB, M158	30	WB	.0360	1.1D	EX-8806568	0408
1325-00-038-4596	BOMB, G.P., MK83	3	PL	445.0	1.1D	EX-8806574	0034
1325-00-038-4638	CTG, SIGNAL (E)	500	WB	.0602	1.4G	EX-8806576	0312
1325-00-087-6404	DISP & BOMB, CBU-12A/A (C)	1	MB	234.3	(04)1.2H	EX-8810623	0245
1325-00-087-6423	DISP & BOMB, CBU-24B/B	1	MB	123.0	(12)1.2D	EX-8806580	0035
1325-00-092-9848	BOMB, G.P., MK81	12	PL	100.0	1.1D	EX-8806581	0034
1325-00-095-5739	BOMB, G.P., MK81	12	PL	100.0	1.1D	EX-8806582	0034
1325-00-106-7724	FUZE, BOMB, FMU-56C/B	10	WB	.0008	1.4D	EX-8810624	0410
1325-00-107-2233	CONTROL, GROUP, MAU-157A/B	4	MB	.9610	1.4S	EX-8810625	0323
1325-00-109-9381	DISP & BOMB, CBU-24B/B	2	WC	123.0	(12)1.2D	EX-8810626	0035
1325-00-109-9390	DISP & BOMB, CBU-49B/B	2	WC	123.0	(12)1.2D	EX-8810627	0035
1325-00-111-8024	FUZE, EXTENSION, KIT, M1A1	10	WB	2.0	1.1D	EX-8806587	0043
1325-00-115-9784	FUZE, BOMB, FMU-54/B	15	WB	.3431	(04)1.2D	EX-8810628	0409
1325-00-117-7328	BOMB, CHEM, BLU-52B/B, CS-2 (B)	1	WB	250.0	(C) 6.1G	EX-8810629	2017
1325-00-133-9266	DISP & BOMB, MK20 MOD 2	1	MB	100.0	1.1D	EX-8803389	0034
1325-00-134-8356	DISP & BOMB, CBU-52B/B	2	MB	146.0	(04)1.2D	EX-8806593	0035
1325-00-134-8357	DISP & BOMB, CBU-52B/B	2	MB	146.0	(04)1.2D	EX-8806594	0035
1325-00-134-8358	DISP & BOMB, ACFT, CBU-52B/B	2	MB	146.0	(04)1.2D	EX-8806595	0035
1325-00-136-0380	FUZE, BOMB, FMU-26B/B	6	WB	.0007	1.4D	EX-8810634	0410
1325-00-142-0648	BOMB, SMK, AN-M47A4, WP (C)	1	WB	74.0	(B) 4.2H	EX-8806596	1381
1325-00-143-6981	BOMB, G.P., M117 TRITONAL	2	PL	382.0	1.1D	EX-8806598	0034
1325-00-143-7092	DISP & BOMB, CBU-24B/B	2	MB	123.0	(12)1.2D	EX-8810636	0035
1325-00-143-7153	FUZE, BOMB, M904E3	30	WB	.1640	1.1D	EX-8806602	0408
1325-00-143-8796	DISP & BOMB, CBU-25B/A	2	MB	35.0	(04)1.2D	EX-8806603	0035
1325-00-147-5387	DISP & BOMB, ACFT, CUB-58(T-1)/B	2	MB	.1400	1.4S	EX-8810639	0367
1325-00-148-4085	FUZE, BOMB, FMU-54A/B	15	WB	.3600	(04)1.2D	EX-8810640	0409
1325-00-151-6377	CONTROL MODULE, GBU-8/B	1	MB	.0145	(M) 2.2S	EX-8810642	1066
1325-00-153-9323	FUZE, BOMB, FMU-72B	12	WB	.0007	1.4D	EX-8806604	0410
1325-00-160-2794	DISP & BOMB, CBU-70/B	2	MB	99.3	(12)1.2D	EX-8806605	0035
1325-00-160-2795	DISP & BOMB, CBU-3S	1	MB	.1800	1.4S	EX-8806606	0349
1325-00-160-4443	DISP & BOMB, CBU-71/B	2	WC	158.0	(04)1.2D	EX-8810643	0035
1325-00-160-4444	DISP & BOMB, CBU-71(T-1)/B	2	WC	.1400	1.4S	EX-8810644	0367
1325-00-163-3124	FUZE, ELECTRONIC, ASSY	1	MC	.0008	1.4D	EX-8810645	0410
1325-00-165-4554	DISP & BOMB, CBU-52B(T-1)/B	2	WC	.1400	1.4S	EX-8810646	0367
1325-00-166-2141	FUZE, BOMB, M909	12	WB	.0150	1.4D	EX-8806607	0410
1325-00-168-5778	BOMB, CLUSTER, INC, M36E2 (DE)	2	PL	111.5	1.3G	EX-8810647	0010

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1325-00-168-5971	FUZE, PROXIMITY, FMU-56B/B	10	WB	.0008	1.4D	EX-8806608	0410
1325-00-169-0472	DISP & BOMB, CBU-7A(T-1)/A	1	MB	.1800	1.4S	EX-8810648	0349
1325-00-172-7546	DISP & BOMB, CBU-38A/A	1	MB	183.0	1.1D	EX-8810650	0034
1325-00-176-2125	BOMB, BLU-82/B	1	PL	12,600	1.1D	EX-	0034
1325-00-176-2127	BOOSTER, AUX, BOMB	30	WB	1.0	1.1D	EX-8810651	0042
1325-00-181-4421	DISP & BOMB, CBU-30(T-1)/B	1	MB	.1800	1.4S	EX-8810652	0349
1325-00-182-3108	DISP & BOMB, CBU-25B/A	1	MC	35.0	(04)1.2D	EX-8806609	0035
1325-00-182-3109	DISP & BOMB, CBU-7A/A	1	MB	58.0	(12)1.2D	EX-8810654	0035
1325-00-182-3300	DISP & BOMB, CBU-58(T-1)/B	2	MB	.1400	1.4S	EX-8810655	0367
1325-00-182-3301	DISP & BOMB, CBU-58(T-1)/B	2	WC	.1400	1.4S	EX-8810656	0367
1325-00-182-3328	DISP & BOMB, CBU-58/B	2	MB	158.0	(04)1.2D	EX-8806610	0035
1325-00-187-1348	CONTROL, GUIDED BOMB	1	FB	.9610	1.4S	EX-8810657	0323
1325-00-193-3186	DISP & BOMB, CBU-58/B	2	WC	158.0	(04)1.2D	EX-8810658	0035
1325-00-195-2677	GUIDE KIT, BOMB	2	MB	.1898	(M) 2.2S	EX-8810659	1066
1325-00-209-3655	DISP & BOMB, CBU-71/B	2	MB	158.0	(04)1.2D	EX-8810661	0035
1325-00-209-6251	DETENT ASSY	325	WB	.0003	1.4B	EX-8711046	0257
1325-00-219-8586	BURSTER, AN/M20	15	WB	.5331	1.1D	EX-8806612	0043
1325-00-219-8676	FUZE, AN-M159	30	WB	.0371	(04)1.2D	EX-8806615	0409
1325-00-236-6912	CONTROL MODULE, GBU-8/B	1	MB	.0145	(M) 2.2S	EX-8810665	1066
1325-00-239-5935	BOMB, G.P., M117	2	PL	382.0	1.1D	EX-8806616	0034
1325-00-241-1591	CONTROL MODULE, GBU-8/B	1	MB	.0145	(M) 2.2S	EX-8810666	1066
1325-00-245-7964	CHG, SPOTTING, CXU-2/B (B)	36	WB	.1036	1.4G	EX-8806618	0197
1325-00-245-7966	CHG, SPOTTING, CXU-1/B (B)	72	WB	.0989	1.4G	EX-8806619	0197
1325-00-245-7976	DISP & BOMB	1	MB	117.7	(12)1.2D	EX-8806620	0035
1325-00-253-5431	PARTS KIT	*	*	.2651	1.4S	EX-8810667	0349
1325-00-255-6306	DISP & BOMB, MK20 MOD 3 (T-1)	1	MB	.0615	1.4S	EX-8806621	0349
1325-00-255-6307	DISP & BOMB, MK20 MOD 3	1	MB	100.0	1.1D	EX-8806622	0034
1325-00-294-4152	BOMB, G.P., MK82	6	PL	192.0	1.1D	EX-8806623	0034
1325-00-303-4668	DISP & BOMB CBU-52B/B	1	MB	146.0	(04)1.2D	EX-8810668	0035
1325-00-313-4871	COMPUTER GROUP, MAU-157B/B	4	MB	.9610	1.4S	EX-8810670	0323
1325-00-315-0390	DISP & BOMB, CBU-38C/A	1	MB	174.0	1.1D	EX-8810671	0034
1325-00-344-2370	ADAPTER BOOSTER	6	WB	.8800	1.1D	EX-8806625	0042
1325-00-350-0812	MANIFOLD, GUIDED BOMB	1	WB	.9602	1.4B	EX-8810672	0350
1325-00-386-2432	FUZE, PROXIMITY, FMU-56D/B	10	WB	.0008	1.4D	EX-8806627	0410
1325-00-386-2434	ADU-449/B ADPT KIT-FUZE TO DISP	10	WB	.0083	1.4C	EX-8810675	0276
1325-00-400-9171	ACTUATOR GUIDED BOMB	1	MB	.0075	(M) 2.2S	EX-8810676	1066
1325-00-406-2776	DISP & BOMB, CBU-38(T-2)/A	1	MB	.1700	1.4S	EX-8810677	0349
1325-00-406-8225	DISP & BOMB, CBU-38/A	1	MB	183.0	1.1D	EX-8810678	0034
1325-00-408-7466	MODIFICATION KIT, MK75 MOD 2	1	MC	.5930	1.1D	EX-8810679	0042
1325-00-409-1726	BOMB, G.P., MK82	6	PL	192.0	1.1D	EX-8806630	0034
1325-00-419-6777	CUTTER & CONT ASSY	1	MB	.0075	(M) 2.2S	EX-8810680	1066

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1305-01-255-6276	CTG, 5.56, M193		1680	WC	.0041	1.4S	EX-8712754	0012
1305-01-258-8694	CTG, 5.56MM, BLANK		1600	MB	.0010	*1.4S	EX-8712756	0014
1310-00-039-1119	CTG,40MM, M81A1, AP		16	MB	.7200	(08)1.2C	EX-8807903	0328
1310-00-039-1123	CTG, 40MM, M81A1, AP-T		16	MB	.6700	(08)1.2C	EX-8807904	0328
1310-00-039-1182	CTG, 40MM, MK2, HEP		16	MB	.8700	(08)1.2E	EX-8807905	0321
1310-00-039-1187	CTG, 40MM, MK2, HEIT-NSD		16	MB	.8700	(08)1.2E	EX-8807906	0321
1310-00-039-1254	CTG, 40MM, MK2, HEIP		16	MB	.8700	(08)1.2E	EX-8807910	0321
1310-00-133-9413	CTG, 40MM, M676		N/A	N/A	N/A	1.4G	EX-8807914	0197
1310-00-143-8863	CTG, 40MM, M384, HE		50	WB	.1169	(12)1.1E	EX-8807918	0006
1310-00-159-3198	CTG, SIGNAL, 40MM, WHITE STAR		44	WC	.2069	1.4G	EX-8807919	0312
1310-00-179-1159	CTG, 40MM, M679		N/A	N/A	.1306	1.4G	EX-8807920	0197
1310-00-180-9359	CTG, 40MM, M385, PRAC		50	WB	.0100	1.4C	EX-8904210	0339
1310-00-238-6559	CTG, 40MM, HEI-P		50	WB	.8700	(08)1.2E	EX-8810602	0321
1310-00-541-6150	CTG, 40MM, M713, RED SMK		44	WC	.1722	1.4G	EX-8807928	0197
1310-00-541-6152	CTG, 40MM, M715, GREEN SMK		44	WC	.1722	1.4G	EX-8807929	0197
1310-00-541-6153	CTG, 40MM, M716, YELLOW SMK		44	WC	.1722	1.4G	EX-8807930	0197
1310-00-554-0092	CTG, 40MM, M81A1, AP-T		16	MB	.6700	(08)1.2C	EX-8807932	0328
1310-00-724-8081	CTG, 40MM, M406, HE		72	WB	.0780	(04)1.2E	EX-8807934	0321
1310-00-849-2083	CTG, 40MM, XM651E1	(B)	24	WB	.1250	1.4G	EX-8807942	0301
1310-00-867-6609	CTG, GRENADE, 40MM, HEDP, M430		50	WB	.0838	(04)1.1E	EX-8812628	0006
1310-00-922-9780	CTG, 40MM, XM583, ILL		44	WB	.2080	1.4G	EX-8807944	0312
1310-00-922-9784	CTG, 40MM, XM585, ILL		44	WC	.1910	1.4G	EX-8807945	0312
1310-00-935-9229	CTG, 40MM, M674, (CS)	(B)	32	WC	.2156	1.4G	EX-8807954	0301
1310-00-935-9230	CTG, 40MM, XM675, SMK		32	WC	.2168	1.4G	EX-8807955	0303
1310-00-963-4061	CTG, 40MM, XM576, ANTI-PER		72	WB	.0038	*1.4S	EX-8807956	0012
1310-00-965-0738	CTG, 40MM, M407A1, PRAC		72	WB	.0008	(04)1.2G	EX-8807957	0015
1310-00-976-0908	CTG, 40MM, HE, M384		50	WB	.1169	(12)1.1E	EX-8807958	0006
1310-00-992-0451	CTG, 40MM, XM433E1, HE		72	WB	.1040	(04)1.1E	EX-8908069	0006
1310-00-994-7441	CTG, 40MM, PRAC, M385		50	WB	.0100	1.4C	EX-8908282A	0339
1310-01-033-8282	CTG, 40MM, HEI-P, M162		16	WB	.8560	(08)1.2E	EX-8810603	0321
1310-01-050-7967	CTG, 40MM, M781, TP		75	WB	.0007	1.4C	EX-8906030	0339
1310-01-148-8881	CTG, 40MM, PRACTICE M781		100	WB	.0008	1.4C	EX-8906028	0339
1310-01-159-3184	CTG, 40MM, PRACTICE M385A1		48	MB	.0104	1.4C	EX-8810383	0339
1310-01-159-8043	CTG, 40MM, M430		48	MB	.0838	(04)1.1E	EX-8712767	0006
1310-01-211-8073	CTG, 40MM, PRACTICE M781		100	WB	.0008	1.4C	EX-8904055	0339
1310-01-218-7069	CTG, 40MM TP, M918		48	WB	.0006	1.4C	EX-8810385	0339
1315-00-021-6478	CTG, 105MM, M60 SMK, WP	(C)	2	WB	7.1	(12)1.2H	EX-8807965	0245
1315-00-028-4859	CTG, 105MM, HE, M1, W/O FUZE		2	WB	5.1	(12)1.2E	EX-8411075	0321
1315-00-028-4860	CTG, 105MM, HE, M1		2	WB	5.1	(12)1.2E	EX-8411075B	0321
1315-00-028-4954	CTG, IGNITION, M3		500	WB	.0171	1.4G	EX-8806187	0325
1315-00-028-4964	CTG, 81MM, ILL, M301	(E)	3	WB	1.6	(08)1.2G	EX-8806188	0171

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHIP CNTR #RDS 3	SHIP CNTR TYPE 4	SHIP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1315-00-028-5033	CTG, 105MM, BLANK, M395		10	WB	1.70	1.3C	EX-8806201	0327
1315-00-028-5036	CTG, 105MM, BLANK, M395		2	WB	1.70	1.3C	EX-8806202	0327
1315-00-068-8472	CTG, 90MM, HEAT, M371E1		2	WB	1.8	(12)1.2E	EX-8806213	0321
1315-00-106-8548	CTG, 105MM, M1, HE		2	WB	4.70	(12)1.2E	EX-8806219	0321
1315-00-113-5912	CTG, 105MM, HE, M1		39	WB	4.70	(12)1.2E	EX-8806220	0321
1315-00-134-8984	CTG, 81MM, HE, M374A2		3	WB	2.10	(08)1.2E	EX-8812843	0321
1315-00-143-7048	CTG, 81MM, ILL, M301A3	(E)	3	WB	1.7	(08)1.2G	EX-8806229	0171
1315-00-143-7122	CTG, 81MM, ILL, M301A2	(E)	3	WB	1.6	(08)1.2G	EX-8806230	0171
1315-00-157-0796	CTG, 105MM, WP, M60A2	(C)	39	WB	7.1	(12)1.2H	EX-8806236	0245
1315-00-439-6122	CTG, 105MM, M60E1, SMK, WP	(C)	2	WB	7.1	(12)1.2H	EX-8806272	0245
1315-00-498-6406	CTG, 81MM, M375, WP	(C)	3	WB	2.0	1.3H	EX-8901007	0246
1315-00-498-6407	CTG., 81MM, HE, M374		3	WB	2.1	(08)1.2E	EX-8806275	0321
1315-00-555-4274	CTG, IGNITION, M3		500	WB	.0171	1.4G	EX-8806284	0325
1315-00-563-7067	CTG, 81MM, M374A3		3	WB	2.10	(08)1.2E	EX-8810605	0321
1315-00-574-7680	CTG, 81MM, WP, M375A3		3	WB	2.0	1.3H	EX-8901006	0246
1315-00-602-5177	CTG, 81MM, HE, M362		3	WB	2.10	(08)1.2E	EX-8806292	0321
1315-00-889-2019	CTG, 90MM, PRAC, M371		4	WB	1.4	(08)1.2E	EX-8806323	0321
1315-00-892-4307	CTG, 90MM, HEAT, M371		2	WB	1.8	(12)1.2E	EX-8812952	0321
1315-00-892-4895	CTG, 105MM, M60, SMK, WP	(C)	2	WB	7.084	(12)1.2H	EX-8806326	0245
1315-00-892-4951	CTG, 75MM, BLANK, M337A1E1		15	WB	1.0	1.3C	EX-8810606	0327
1315-00-926-4081	CTG, 105MM, HE, M1		2	WB	5.1	(12)1.2E	EX-8411075L	0321
1315-00-926-9243	CTG, 90MM, CANISTER, XM590E1		6	WB	1.6	(08)1.2C	EX-8810389	0328
1315-00-935-1992	CTG, 81MM, TP, M43A1		4	WB	.1838	(08)1.2E	EX-8806346	0321
1315-00-935-6003	CTG, 81MM, M375, SMK, WP	(C)	3	WB	2.0	(12)1.2H	EX-8806348	0245
1315-00-935-6008	CTG, 81MM, M374		3	WB	2.10	(08)1.2E	EX-8806350	0321
1315-00-935-6030	CTG, 81MM, M374		3	WB	2.10	(08)1.2E	EX-8806354	0321
1315-00-935-6032	CTG, 81MM, HE, M374		3	WB	2.10	(08)1.2E	EX-8806356	0321
1315-00-935-6033	CTG, 81MM, M374		3	WB	2.10	(08)1.2E	EX-8806357	0321
1315-01-073-9920	CTG, 105, CLEARING		2	MB	2.9	1.3C	EX-8810607	0327
1315-01-360-4896	CTG, 105MM, HE, M1		39	WB	4.7	(12)1.2E		0321
1325-00-006-2082	DISP & BOMB, MK20 MOD 4		1	MB	100.0	1.1D	EX-8806555	0034
1325-00-009-3729	FUZE, BOMB, MK339 MOD 1		9	MB	.0006	1.4D	EX-8806558	0410
1325-00-009-4260	FUZE, BOMB, FMU-107/B		15	WB	.0027	(04)1.2D	EX-8806559	0409
1325-00-009-9565	CABLE ASSY		1	FB	.0008	1.4S	EX-8810609	0349
1325-00-009-9598	CONTROL, GUIDED BOMB		1	FB	.9610	1.4S	EX-8810610	0323
1325-00-025-3277	IGNITER, BOMB, AN-M23A1, WP	(C)	24	WB	1.3	(B) 4.2H	EX-8806561	1381
1325-00-025-9358	BOMB, G.P., MK84		2	PL	945.0	1.1D	EX-8806563	0034

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1305-01-172-9558	CTG, 9MM, XM882	1000	MB	.0009	*1.4S	EX-8606108	0012
1305-01-181-1295	CTG, 30MM, HPT	575	MB	.3313	1.4C	EX-8603003	0339
1305-01-199-6737	CTG, 25MM, PGU-25	100	MB	.0662	(04)1.2E	EX-8712732	0321
1305-01-209-4292	CTG, 20MM HEI, M56A2	100	MB	.0285	(04)1.2E		0321
1305-01-211-6248	CTG, 20MM HEI, M56A1	250	MB	.0285	(04)1.2E		0321
1305-01-213-9656	CTG, 20MM TP, PGU-27/B	250	MB	.0861	1.4C	EX-8712738	0339
1305-01-213-9657	CTG, 20MM TPT, PGU-30/B	250	MB	.0891	1.4C	EX-8712739	0339
1305-01-213-9658	CTG, 20MM SAPHEI, PGU-28/B	250	MB	.0223	(04)1.2E	EX-8712740	0321
1305-01-225-8202	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	EX-8808602	0321
1305-01-225-8203	CTG, 30MM, PGU-13A/B HEI (HONEY)	575	MB	.1019	(04)1.2E	EX-8808603	0321
1305-01-225-8204	CTG, 30MM, PGU-15/B TP (HONEY)	575	MB	.3310	1.4C	EX-8808604	0339
1305-01-232-6180	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO) (AERO)	575	MB	.0916	(04)1.2E	EX-8810601	0321
1305-01-232-8338	CTG, 12 GAGE, SHOTGUN	320	WC	.0038	*1.4S	EX-8712746	0012
1305-01-252-0153	CTG, 5.56MM, BALL/TRACER (4 TO 1 RATIO)	1600	MB	.0037	*1.4S	EX-8712753	0012

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1305-00-935-6059	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	EX-8807870	0321
1305-00-935-6060	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	EX-8807871	0339
1305-00-935-6164	CTG, 9MM	1536	WB	.0009	*1.4S	EX-8807872	0012
1305-00-935-6171	CTG, 20MM, XM242, HEI-T	200	MB	.0251	(04)1.2E	EX-8712699	0321
1305-00-935-9104	CTG, 20MM, M56A3, HEI	200	MB	.0285	(04)1.2E	EX-8807873	0321
1305-00-935-9247	CTG, 7.62MM, M80	1500	MC	.0067	*1.4S	EX-8807874	0012
1305-00-965-0559	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	EX-8807877	0339
1305-00-965-0560	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	EX-8807878	0321
1305-00-965-0775	CTG, 5.56MM, M193, BALL	1000	FB	.0041	*1.4S	EX-8812559	0012
1305-00-965-0832	CTG, 5.56MM, XM196	1440	WC	.0041	*1.4S	EX-8807880	0012
1305-00-965-0873	CTG, 20MM, M204, TP	150	MB	.0718	1.4C	EX-8810564	0339
1305-00-968-5892	CTG, 5.56MM, M193	1400	WC	.0041	*1.4S	EX-8810566	0012
1305-01-010-0258	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	EX-8807882	0339
1305-01-011-6324	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	EX-8807883	0321
1305-01-023-1907	CTG, 30MM, PGU-15/B, TP (HONEY)	36	MB	.3310	1.4C	EX-8810567	0339
1305-01-023-1908	CTG, 30MM, PGU-13/B, HEI (HONEY)	36	MB	.1019	(04)1.2E	EX-8810568	0321
1305-01-023-1909	CTG, 30MM, PGU-14/B, APIT (HONEY)	36	MB	.3389	1.4C	EX-8810569	0339
1305-01-056-4626	CTG, 30MM, PGU-14A/B, & PGU-13/B (5 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	EX-8810570	0321
1305-01-056-4906	CTG, 20MM, TP, M55A2	230	MC	.0861	1.4C	EX-	0339
1305-01-056-4907	CTG, 30MM, PGU-14A/B, & PGU-13/B (5 TO 1 RATIO) (HONEY)	588	MB	.1019	(04)1.2E	EX-8810571	0321
1305-01-057-5335	CTG, 30MM, PGU-13/B, HEI (AERO)	588	MB	.0916	(04)1.2E	EX-8810572	0321
1305-01-057-7912	CTG, 30MM, PGU-14A/B, API (HONEY)	36	MB	.3389	1.4C	EX-8810573	0339
1305-01-057-7913	CTG, 30MM, PGU-14A/B, B/B, API (AERO)	36	MB	.3419	1.4C	EX-8810574	0339
1305-01-057-7914	CTG, 30MM, PGU-15/B, TP (AERO)	588	MB	.3308	1.4C	EX-8810575	0339
1305-01-059-2594	CTG, 30MM, PGU-15/B, TP (HONEY)	588	MB	.3310	1.4C	EX-8810576	0339
1305-01-061-2213	CTG, 20MM, TP/TPT	100	MB	.0861	1.4C	EX-8810577	0339
1305-01-061-2214	CTG, 30MM, PGU-14/B & PGU-13/B (5 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	EX-8810578	0321
1305-01-062-0070	CTG, 30MM, PGU-15/B & PGU-13/B (2 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	EX-8810579	0321
1305-01-062-0071	CTG, 30MM, PGU-15/B & PGU-13/B (2 TO 1 RATIO) (HONEY)	588	MB	.1019	(04)1.2E	EX-8810580	0321
1305-01-063-2167	CTG, 30MM, PGU-14/B & PGU-13/B (5 TO 1 RATIO) (HONEY)	588	MB	.1019	(04)1.2E	EX-8810581	0321
1305-01-063-2168	CTG, 30MM, PGU-13/B, HEI (HONEY)	588	MB	.1019	(04)1.2E	EX-8810582	0321
1305-01-078-4879	CTG, CAL .50, BLANK, M1A1	200	WC	.0068	1.4C	EX-8810372	0338
1305-01-083-5998	CTG, 30MM, PGU-14B/B & PGU-13/B (5 TO 1 RATIO) (AERO)	588	MB	.0916	(04)1.2E	EX-8808600	0321
1305-01-090-7526	CTG, 30MM, HIGH PRESSURE TEST	36	MB	.3313	1.4C	EX-8810583	0339

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR #RDS 3	SHIP CNTR TYPE 4	SHIP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1305-01-093-3338	CTG, 30MM, PGU-15/B, TP (HONEY)	575	MB	.3310	1.4C	EX-8810584	0339
1305-01-093-3339	CTG, 30MM, PGU-13/B, HEI (HONEY)	575	MB	.1019	(04)1.2E	EX-8810585	0321
1305-01-093-3340	CTG, 30MM, PGU-14A/B & PGU-13/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	EX-8810586	0321
1305-01-093-9568	CTG, 30MM, PGU-15/B, TP (AERO)	575	MB	.3308	1.4C	EX-8810587	0339
1305-01-095-1062	CTG, 30MM, PGU-14B/B AND PGU-13/B (5 TO 1 RATIO) (AERO)	575	MB	.0916	(04)1.2E	EX-8810588	0321
1305-01-095-9650	CTG, 30MM, PGU-13/B, HEI (AERO)	575	MB	.0916	(04)1.2E	EX-8810589	0321
1305-01-109-6985	CTG, 30MM, PGU-13A/B, HEI (HONEY)	575	MB	.1019	(04)1.2E	EX-8810590	0321
1305-01-111-6977	CTG, 30MM, HIGH PRESSURE TEST (AERO)	575	MB	.3313	1.4C	EX-8810591	0339
1305-01-113-2462	CTG, 30MM, PGU-14A/B, AND PGU-13A/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	EX-8810592	0321
1305-01-116-3928	CTG, 20MM, M56A4, M242, HEI/HEIT	100	MB	.0285	(04)1.2E		0321
1305-01-116-3930	CTG, 20MM, HPT	250	MB	.0861	1.4C	EX-	0339
1305-01-116-3931	CTG, 20MM, M56A3, HEI	250	MB	.0285	(04)1.2E		0321
1305-01-116-3932	CTG, 20MM, M56A4, M220, HEI/TPT	100	MB	.0285	(04)1.2E		0321
1305-01-116-3935	CTG, 20MM, M56A4, HEI	100	MB	.0285	(04)1.2E		0321
1305-01-116-4560	CTG, 20MM, M55A2, TP	250	MB	.0861	1.4C	EX-8712715	0339
1305-01-116-4959	CTG, 5.56MM BALL, PLASTIC	2000	FB	.0013	*1.4S	EX-8506051	0012
1305-01-118-9928	CTG, 20MM, M56A4, HEI	250	MB	.0285	(04)1.2E		0321
1305-01-118-9929	CTG, 20MM, M242, HEI-T	250	MB	.0251	(04)1.2E		0321
1305-01-118-9930	CTG, 20MM, M220, TP-T	250	MB	.0861	1.4C	EX-8712717	0339
1305-01-119-6068	CTG, 20MM, M56A4, HEI	100	MB	.0285	(04)1.2E		0321
1305-01-118-7862	CTG, 20MM, M56A4, M242, HEI/HEIT	100	MB	.0285	(04)1.2E		0321
1305-01-120-0970	CTG, 7.62MM M852	460	MB	.0064	*1.4S	EX-8810379	0012
1305-01-136-3622	CTG, 25MM TP, PGU-23/U	80	MB	.2095	1.4C	EX-8712720	0339
1305-01-140-8530	CTG, 30MM, PGU-15/B, TP (HONEY)	575	MB	.3310	1.4C	EX-8810593	0339
1305-01-141-6054	CTG, 30MM, PGU-15/B, TP (AERO)	575	MB	.3308	1.4C	EX-8810594	0339
1305-01-143-8592	CTG, 5.56MM, M193/M196 (2 TO 1 RATIO)	1680	WC	.0051	*1.4S	EX-8808601	0012
1305-01-144-9301	CTG, 30MM, PGU-13A/B, HEI (AERO)	575	MB	.0916	(04)1.2E	EX-8810595	0321
1305-01-146-1530	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO)	575	MB	.0916	(04)1.2E	EX-8810596	0321
1305-01-155-5459	CTG, 5.56MM, M855	1680	WC	.0036	*1.4S	EX-8501076C	0012
1305-01-156-7584	CTG, 5.56MM, BALL/TRACER (4 TO 1 RATIO)	200	MB	.0036	*1.4S	EX-8501077A	0012
1305-01-157-2627	CTG, 30MM, PGU-14B/B & PGU-13A/B (5 TO 1 RATIO) (AERO)	575	MB	.0916	(04)1.2E	EX-8810597	0321
1305-01-161-0621	CTG, 30MM, PGU-13A/B HEI (HONEY)	575	MB	.1019	(04)1.2E	EX-8810598	0321
1305-01-161-0622	CTG, 30MM, PGU-14A/B & PGU-13A/B (5 TO 1 RATIO) (HONEY)	575	MB	.1019	(04)1.2E	EX-8810599	0321
1305-01-161-0623	CTG, 30MM, PGU-13A/B HEI (AERO)	575	MB	.0916	(04)1.2E	EX-8810600	0321

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1305-00-301-1692	CTG, CAL .38, M41	1500	WB	.0006	*1.4S	EX-8807757	0012
1305-00-301-1694	CTG, CAL .45, BLANK, M9	900	WB	.0011	*1.4S	EX-8810535	0014
1305-00-301-1696	CTG, CAL .45, LINE THROWING, M32	330	WB	.0072	*1.4S	EX-8807758	0014
1305-00-305-0894	CTG, CAL .50, M23	200	WC	.0342	1.4G	EX-8807764	0300
1305-00-305-0902	CTG, CAL .22	10,200	WC	.0003	*1.4S	EX-8807765	0012
1305-00-308-5569	CTG, 20MM, M54, HPT	200	MB	.0861	1.4C	EX-8807768	0339
1305-00-308-5810	CTG, 9MM, M1	3840	WB	.0009	*1.4S	EX-8807769	0012
1305-00-322-6359	CTG, 30MM, TP	64	WB	.3400	(04)1.2C	EX-8807771	0328
1305-00-322-6391	CTG, CAL .38, M41	2400	WC	.0006	*1.4S	EX-8807773	0012
1305-00-416-5809	CTG, 30MM, APIT, PGU-14/B (AERO)	36	MB	.3419	1.4C	EX-8810537	0339
1305-00-416-5813	CTG, 30MM, TP, PGU-15/B (AERO)	36	MB	.3308	1.4C	EX-8810538	0339
1305-00-416-5814	CTG, 30MM, HEI, PGU-13/B (AERO)	36	MB	.0916	(04)1.2E	EX-8810539	0321
1305-00-522-3700	CTG, 20MM, M220E1, TPT	200	MB	.0915	1.4C	EX-8807780	0339
1305-00-529-8878	CTG, CAL .22, HORNET, M65	2000	WB	.0019	*1.4S	EX-8810540	0012
1305-00-540-7862	CTG, CAL .45, WADCUTTER	1500	WB	.0008	*1.4S	EX-8807784	0012
1305-00-540-9132	CTG, CAL .30, M1	4800	WB	.0021	*1.4S	EX-8807785	0012
1305-00-540-9461	CTG, CAL .30, M2	1320	WC	.0074	*1.4S	EX-8810541	0012
1305-00-540-9488	CTG, CAL .30, M2	500	WB	.0074	*1.4S	EX-8810542	0012
1305-00-541-9834	CTG, CAL .50, M2, M17	200	WC	.0339	1.4C	EX-8807787	0339
1305-00-542-0405	CTG, 20MM, M55A2, TP	100	WB	.0861	1.4C	EX-8807789	0339
1305-00-542-0518	CTG, 20MM, M56A1, HEI	54	WB	.0285	(04)1.2E	EX-8807791	0321
1305-00-542-1120	CTG, 20MM, M56A1E1, HEI	52	WB	.0285	(04)1.2E	EX-8810543	0321
1305-00-542-1196	CTG, 7.62MM, M80, M62	400	WC	.0067	*1.4S	EX-8807792	0012
1305-00-542-1968	CTG, 7.62MM, M80	800	WC	.0067	*1.4S	EX-8807793	0012
1305-00-546-5830	CTG, CAL .30, M72	960	WC	.0072	*1.4S	EX-8807794	0012
1305-00-553-4779	CTG, CAL 38SP, PGU-12/B, BALL	2000	FB	.0008	*1.4S	EX-8810544	0012
1305-00-554-6709	CTG, 20MM, M56A1, HEI	100	MB	.0285	(04)1.2E	EX-8810545	0321
1305-00-555-4055	CTG, CAL .50, M8	210	WC	.0336	1.4G	EX-8807795	0300
1305-00-555-4056	CTG, CAL .50, M33	200	WC	.0342	1.4C	EX-8807796	0339
1305-00-555-4057	CTG, CAL .50, M8	200	WC	.0336	1.4G	EX-8807797	0300
1305-00-555-4059	CTG, CAL .50, M8	440	WB	.0336	1.4G	EX-8810546	0300
1305-00-565-2636	CTG, CAL .30, M72	800	WC	.0072	*1.4S	EX-8807804	0012
1305-00-585-5187	CTG, CAL .50, M17	*	*	.0325	1.4C	EX-8807806	0339
1305-00-585-5188	CTG, CAL .50, M17	240	WC	.0325	1.4C	EX-8812491	0339
1305-00-585-5368	CTG, CAL .50, M2	200	WB	.0339	1.4C	EX-8810551	0339
1305-00-585-5383	CTG, CAL .50, M8	200	WB	.0339	1.4G	EX-8810552	0300
1305-00-684-1877	CTG, CAL .45, WADCUTTER	1000	WB	.0008	*1.4S	EX-8810553	0012
1305-00-690-5118	CTG,CAL .22	5000	FB	.0003	*1.4S	EX-8807808	0012
1305-00-723-2552	CTG, 20MM, M56A1E1, HEI	54	WB	.0285	(04)1.2E	EX-8810554	0321
1305-00-752-8087	CTG, 7.62MM, BLANK, XM82	800	WC	.0022	*1.4S	EX-8807813	0014
1305-00-752-8114	CTG, 20MM, TP, M55A2	200	MB	.0861	1.4C	EX-8807815	0339

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1305-00-752-8833	CTG, 20MM, M56A1E1, HEI	100	MB	.0285	(04)1.2E	EX-8810555	0321
1305-00-752-8837	CTG, 7.62MM, BALL, M80	840	WB	.0067	*1.4S	EX-8807816	0012
1305-00-756-1675	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	EX-8807818	0339
1305-00-764-8436	CTG, 5.56MM, BLANK, XM200	2080	WC	.0011	*1.4S	EX-8807821	0014
1305-00-776-4639	CTG, CAL .45, M1911	1000	FB	.0008	*1.4S	EX-8807822	0012
1305-00-776-4640	CTG, CAL .38	1200	FB	.0006	*1.4S	EX-8812512	0012
1305-00-783-5482	CTG, 20MM, M56A3, M242, HEI/HEIT	100	MB	.0285	(04)1.2E	EX-8807824	0321
1305-00-785-2829	CTG, 20MM, M220, TPT	200	MB	.0861	1.4C	EX-8807825	0339
1305-00-810-8250	CTG, CAL .38, BLANK	2000	*	.0006	*1.4S	EX-8810557	0014
1305-00-819-6017	CTG, CAL .22	*	*	.0003	*1.4S	EX-8810558	0012
1305-00-834-5509	CTG, 20MM, T221E2, API	100	MB	.0954	1.4G	EX-8810559	0300
1305-00-849-4535	CTG, 20MM, M53, API	100	MB	.0954	1.4G	EX-8807835	0300
1305-00-850-3676	CTG, 20MM, M56A2, HEI	100	MB	.0285	(04)1.2E	EX-8810560	0321
1305-00-850-3986	CTG, 20MM, M53, API	100	MB	.0954	1.4G	EX-8810561	0300
1305-00-880-2112	CTG, 20MM, M210, HEI	150	MB	.0171	(04)1.2E	EX-8807837	0321
1305-00-880-7148	CTG, 20MM, M210, HEI	150	MB	.0171	(04)1.2E	EX-8810562	0321
1305-00-889-2042	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	EX-8807839	0321
1305-00-889-2043	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	EX-8807840	0321
1305-00-889-2169	CTG, 7.62MM, M80, M62	800	WC	.0067	*1.4S	EX-8807841	0012
1305-00-892-2150	CTG, 7.62MM, M80, M62	800	WC	.0067	*1.4S	EX-8807842	0012
1305-00-892-2161	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	EX-8807843	0339
1305-00-892-2162	CTG, 20MM, M56A2, HEI	100	MB	.0285	(04)1.2E	EX-8810563	0321
1305-00-892-2330	CTG, 7.62MM, M80	800	WC	.0067	*1.4S	EX-8807844	0012
1305-00-892-2526	CTG, CAL .45, M1911	2000	WC	.0008	*1.4S	EX-8807846	0012
1305-00-892-4157	CTG, CAL .30 MATCH, M72	960	WB	.0072	*1.4S	EX-8807848	0012
1305-00-892-4230	CTG, CAL .45, M1911	1000	MC	.0008	*1.4S	EX-8807849	0012
1305-00-892-4254	CTG, 12 GAGE, SHOTGUN, XM162	240	WC	.0038	*1.4S	EX-8807850	0012
1305-00-892-4321	CTG, 20MM, M56E2, HEI	100	MB	.0285	(04)1.2E	EX-8807851	0321
1305-00-914-4675	CTG, 7.62MM, BALL M80	840	WB	.0067	*1.4S	EX-8807853	0012
1305-00-914-4719	CTG, 5.56MM, XM196	1640	WC	.0041	*1.4S	EX-8912070	0012
1305-00-926-3930	CTG, 5.56MM, M193	1680	WC	.0041	*1.4S	EX-8807855	0012
1305-00-926-3942	CTG, 7.62MM, M80, M62	1500	MC	.0067	*1.4S	EX-8807857	0012
1305-00-926-3963	CTG, CAL .30, M1	2700	WC	.0021	*1.4S	EX-8807858	0012
1305-00-926-3970	CTG, 5.56MM, M193	1640	WC	.0041	*1.4S	EX-8807859	0012
1305-00-926-4017	CTG, 7.62MM, M62 TRACER	920	WC	.0066	*1.4S	EX-8807860	0012
1305-00-926-4057	CTG, 20MM, M55A2, M220	100	MB	.0915	1.4C	EX-8807861	0339
1305-00-926-4058	CTG, 20MM, M56A3, M220, HEI/TPT	100	MB	.0285	(04)1.2E	EX-8807254	0321
1305-00-926-4059	CTG, 20MM, M55A2, M220, TP/TPT	100	MB	.0915	1.4C	EX-8807862	0339
1305-00-926-4060	CTG, 20MM, M56A3, M220, HEI/TPT	100	MB	.0285	(04)1.2E	EX-8807863	0321
1305-00-926-9302	CTG, 5.56MM, BLANK	1880	WB	.0011	*1.4S	EX-8807864	0014
1305-00-935-2019	CTG, 20MM, M54, HPT	200	MB	.0861	1.4C	EX-8807869	0339

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1305-00-028-6309	CTG, CAL .50, AP, M2	210	WC	.0339	1.4C	EX-8812268	0339
1305-00-028-6341	CTG, CAL .50, M2	210	WB	.0339	1.4C	EX-8810512	0339
1305-00-028-6346	CTG, CAL .50, M2, M17	210	WB	.0339	1.4C	EX-8807645	0339
1305-00-028-6348	CTG, CAL .50, M2, M17	110	WB	.0339	1.4C	EX-8810514	0339
1305-00-028-6355	CTG, CAL .50, M2	210	WB	.0339	1.4C	EX-8810515	0339
1305-00-028-6367	CTG, CAL .50, M2	265	WB	.0339	1.4C	EX-8810518	0339
1305-00-028-6369	CTG, CAL .50, M2	110	WB	.0339	1.4C	EX-8810519	0339
1305-00-028-6375	CTG, CAL .50, M2	240	WB	.0339	1.4C	EX-8810521	0339
1305-00-028-6380	CTG, CAL .50, BLANK	200	WC	.0069	1.4C	EX-8807649	0338
1305-00-028-6464	CTG, CAL .50, M8	240	WB	.0336	1.4G	EX-8807654	0300
1305-00-028-6466	CTG, CAL .50, M8, M20	210	WC	.0336	1.4G	EX-8807655	0300
1305-00-028-6474	CTG, CAL .50, M8	210	WC	.0336	1.4G	EX-8807657	0300
1305-00-028-6475	CTG, CAL .50, M8	210	WC	.0336	1.4G	EX-8807658	0300
1305-00-028-6476	CTG, CAL .50, M8	210	WC	.0336	1.4G	EX-8807659	0300
1305-00-028-6477	CTG, CAL .50, M8	265	WB	.0336	1.4G	EX-8807660	0300
1305-00-028-6480	CTG, CAL .50, M8	110	WB	.0336	1.4G	EX-8807661	0300
1305-00-028-6491	CTG, CAL .50, M8, M20	265	WB	.0336	1.4G	EX-8807664	0300
1305-00-028-6507	CTG, CAL .30, M1	1600	WB	.0021	*1.4S	EX-8807666	0012
1305-00-028-6509	CTG, CAL .30, M1	1200	WB	.0021	*1.4S	EX-8807667	0012
1305-00-028-6510	CTG, CAL .30, M27	1200	WB	.0019	*1.4S	EX-8807668	0012
1305-00-028-6524	CTG, CAL .30, M2	960	WC	.0074	*1.4S	EX-8810522	0012
1305-00-028-6535	CTG, CAL .30, M2	1040	WB	.0074	*1.4S	EX-8807670	0012
1305-00-028-6542	CTG, CAL .30, M2, M1	1000	WC	.0074	*1.4S	EX-8807671	0012
1305-00-028-6562	CTG, CAL .50, M2, M17	100	MB	.0339	1.4C	EX-8812326	0339
1305-00-028-6570	CTG, CAL .50, M33	200	WB	.0342	1.4C	EX-8810523	0339
1305-00-028-6572	CTG, CAL .50, M2, M17	224	WB	.0339	1.4C	EX-8810524	0339
1305-00-028-6574	CTG, CAL .50, BALL	200	WB	.0342	1.4C	EX-8812329	0339
1305-00-028-6575	CTG, CAL .50, M33	200	WB	.0342	1.4C	EX-8810525	0339
1305-00-028-6577	CTG, CAL .50, M33	221	WB	.0342	1.4C	EX-8807676	0339
1305-00-028-6578	CTG, CAL .50, M33	220	WB	.0342	1.4C	EX-8810526	0339
1305-00-028-6580	CTG, CAL .50, M33	210	WB	.0342	1.4C	EX-8810527	0339
1305-00-028-6582	CTG, CAL .50, M33, M17	200	WB	.0342	1.4C	EX-8807677	0339
1305-00-028-6583	CTG, CAL .50, M33, M17	200	WB	.0342	1.4C	EX-8807678	0339
1305-00-028-6588	CTG, CAL .50, M8	224	WB	.0336	1.4G	EX-8807679	0300
1305-00-028-6590	CTG, CAL .50, M8	200	WB	.0336	1.4G	EX-8807680	0300
1305-00-028-6592	CTG, CAL .50, M8	200	WB	.0336	1.4G	EX-8807681	0300
1305-00-028-6594	CTG, CAL .50, M1	224	WB	.0346	1.4G	EX-8807682	0300
1305-00-028-6603	CTG, CAL .50, M8, M20	200	WC	.0336	1.4G	EX-8807683	0300
1305-00-028-6609	CTG, CAL .50, M17	200	WC	.0325	1.4C	EX-8807685	0339
1305-00-028-6616	CTG, CAL .45, M1911	1200	WC	.0008	*1.4S	EX-8804236	0012.
1305-00-028-6629	CTG, CAL .38, M41	1200	WB	.0006	*1.4S	EX-8807691	0012

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR #RDS 3	SHIP CNTR TYPE 4	SHIP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1305-00-028-6635	CTG, CAL .45, BLANK, M9	1200	WB	.0011	*1.4S	EX-8807692	0014
1305-00-028-6636	CTG, CAL .45, BLANK, M9	2000	WB	.0011	*1.4S	EX-8810528	0014
1305-00-028-6637	CTG, CAL .45, BLANK, M9	1200	WB	.0011	*1.4S	EX-8810529	0014
1305-00-028-6644	CTG, .410 GAGE, SHOTGUN	450	WB	.0011	*1.4S	EX-8807694	0012
1305-00-047-3871	CTG, CAL .30, BLANK, M1909	1240	WC	.0041	*1.4S	EX-8807702	0014
1305-00-057-1876	CTG, 5.56MM, M193	720	FB	.0051	*1.4S	EX-8804246	0012
1305-00-064-2896	CTG, 7.62MM, M118	920	WC	.0064	*1.4S	EX-8807703	0012
1305-00-078-8220	CTG, 20MM, M55A2, M220	1000	MB	.0861	1.4C	EX-8807705	0339
1305-00-096-3141	CTG, CAL .50, M2	200	WB	.0339	1.4C	EX-8810530	0339
1305-00-096-3150	CTG, CAL .30, M2	800	WC	.0074	*1.4S	EX-8807707	0012
1305-00-096-3168	CTG, .410 GAGE, SHOTGUN, M35	500	WB	.0011	*1.4S	EX-8807712	0012
1305-00-117-2796	CTG, 20MM, M56A3, M53, HEI/API	100	MB	.0285	(04)1.2E	EX-8807713	0321
1305-00-123-0548	CTG, CAL .38	2500	WB	.0006	*1.4S	EX-8807714	0012
1305-00-143-7049	CTG, 20MM, M95, M96, APT, INC	150	MB	.0775	(04)1.2G	EX-8807718	0009
1305-00-143-7050	CTG, 20MM, M95, M96, APT, INC	150	MB	.0775	(04)1.2G	EX-8807719	0009
1305-00-143-7167	CTG, 20MM, M96, INC	150	MB	.0775	(04)1.2G	EX-8807720	0009
1305-00-143-7168	CTG, 20MM, M96, INC	150	WB	.0775	(04)1.2G	EX-8807721	0009
1305-00-143-7176	CTG, 20MM, M210, M96, HEI, INC	150	MB	.0171	(04)1.2E	EX-8807722	0321
1305-00-144-5527	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	EX-8807724	0321
1305-00-144-5545	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	EX-8807725	0339
1305-00-147-5568	CTG, 12 GAGE SHOTGUN	240	WC	.0029	*1.4S	EX-8807727	0012
1305-00-152-3292	CTG, 7.62MM, M80, M62	1500	MC	.0067	*1.4S	EX-8912139	0012
1305-00-152-3662	CTG, 20MM, M56A3, M242, HEI/HEIT	100	MB	.0285	(04)1.2E	EX-8807728	0321
1305-00-169-1880	CTG, 20MM, M56A3, M53, HEI, API	100	MB	.0285	(04)1.2E	EX-8810531	0321
1305-00-169-8805	CTG, 20MM, API-T	100	WB	.1011	1-4G	EX-8807730	0300
1305-00-180-9268	CTG, 20MM, M55A2, TP	100	MB	.0861	1.4C	EX-8807732	0339
1305-00-180-9270	CTG, 20MM, M210, M96, M95, HEI/API/INC	150	MB	.0171	(04)1.2E	EX-8807733	0321
1305-00-180-9271	CTG, 20MM, M210, M96, M95, HEI/API/INC	150	MB	.0171	(04)1.2E	EX-8807734	0321
1305-00-182-3081	CTG, 20MM, M56A3, HEI	100	MB	.0285	(04)1.2E	EX-8807735	0321
1305-00-182-3217	CTG, 5.56MM, BLANK, M200	2280	MC	.0011	*1.4S	EX-8807738	0014
1305-00-182-3254	CTG, 20MM, M55A2, M220	100	MB	.0861	1.4C	EX-8810532	0339
1305-00-186-0204	CTG, CAL .32, BLANK	50	FB	.0003	*1.4S	EX-8810533	0014
1305-00-204-0848	CTG, .410 GAGE, SHOTGUN	500	FB	.0011	*1.4S	EX-8807741	0012
1305-00-262-4181	CTG, 20MM, M56A2, HEI	200	MB	.0285	(04)1.2E	EX-8810534	0321
1305-00-301-1589	CTG, 20MM, T221E2, API	56	WB	.0954	1.4G	EX-8807745	0300
1305-00-301-1661	CTG, CAL .30, M1	1680	WC	.0021	*1.4S	EX-8807748	0012
1305-00-301-1663	CTG, CAL .30, M27	2160	WC	.0019	*1.4S	EX-8807750	0012
1305-00-301-1665	CTG, CAL .30, M2	768	WC	.0074	*1.4S	EX-8807751	0012
1305-00-301-1670	CTG, CAL .30, BLANK, M1909	960	WC	.0018	*1.4S	EX-8807752	0014
1305-00-301-1685	CTG, CAL .45, M1911	2000	WC	.0008	*1.4S	EX-8807753	0012
1305-00-301-1691	CTG, CAL .38, WADCUTTER	2000	WB	.0004	*1.4S	EX-8807756	0012

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1305-00-028-6261	CTG, CAL .30, M1TR	1500	WB	.0020	*1.4S	EX-8807636	0012
1305-00-028-6285	CTG, CAL .30, M25TR	480	WB	.0072	*1.4S	EX-8807638	0012
1305-00-028-6288	CTG, CAL .30, M25TR	960	WB	.0072	*1.4S	EX-8807639	0012
1305-00-028-6296	CTG, CAL .50, M2	350	WB	.0339	1.4C	EX-8807641	0339

Table 3-2. UN Explosive Hazard Classification

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1055-00-106-1206	LAUNCHER, LAU 74/A	1	PL	.0013	1.4S	EX-8810457	0173
1005-00-106-1209	JETTISON ACTUATOR	1	FB	.0013	1.4S	EX-8810458	0173
1105-00-243-2161CM	SPECIAL WEAPON PARA	1	MB	.0030	1.4S	EX-8810459	0349
1105-00-344-4328CM	PARA & CONTAINER, BOMB	1	*	.0078	1.4S	EX-8810460	0349
1105-00-689-0951CM	PARA SYS	1	MB	.0078	1.4S	EX-8810461	0349
1105-00-875-6144CM	RELEASE, PARA	1	WB	.0067	1.4S		
1105-00-953-5803CM	PLATE, CLOSING, BALLISTIC CASE	1	WB	.0076	1.4S		
1105-00-959-7659CM	WEAPON SUBASSY ATOMIC	1	WB	.0781	1.4S		
1105-00-999-3688CM	WEAPON SUBASSY ATOMIC	1	WB	.0781	1.4S		
1115-00-014-0527CM	CABLE ASSY	1	FB	.0002	1.4S	EX-8810462	0454
1115-00-072-4933CM	CABLE ASSY	1	FB	.0002	1.4S	EX-8810463	0454
1115-00-150-5899CM	AFT COVERS (BX1)	6	WB	.0550	(04)1.2B	EX-8810466	0107
1115-00-150-5899CM	AFT COVERS (BX2)	1	WB	.0004	(A) 8S	EX-8808588	2794
1115-00-150-5899CM	AFT COVERS (BX3)	2	WB	.0003	(04)1.2B	EX-8808596	0107
1115-00-150-5900CM	MK6 REENTRY VEHICLE (BX1)	6	WB	.0550	(04)1.2B	EX-8810467	0107
1115-00-150-5900CM	MK6 REENTRY VEHICLE (BX2)	1	WB	.0004	1.4S	EX-8808589	0349
1115-00-150-5900CM	MK6 REENTRY VEHICLE (BX3)	2	WB	.0003	(04)1.2B	EX-8808597	0107
1115-00-224-2186CM	TEST PKG, MIDSECTION	1	MB	N/A	1.4B	EX-8810469	0257
1115-00-227-6643CM	CONTROL BOX ASSY	1	FB	.0009	1.4S	EX-8810470	0349
1115-00-417-0859CM	SERVICE STAR SAMPLE PACKAGE	1	WB	.3616	1.4C	EX-8810472	0276
1115-00-759-5216CM	INITIATOR SHAPED CHG	*	*	.0013	(04)1.2B	EX-8810474	0107
1115-00-874-4500CM	TURN-AROUND KIT, MK11C	1	WB	.0058	1.4B	EX-8810476	0257
1115-00-994-1721CM	CABLE ASSY	1	FB	.0002	1.4S	EX-8810480	0454
1115-01-075-8224CM	RECORDER DATA PACKAGE	1	MB	.0007	(A) 8S	EX-8810481	2794
1115-01-081-1225CM	ARMING & FUZING ASSY, FWD SEC	1	MB	.0006	(A) 8L	EX-8808598	2794
1115-01-083-5017CM	ARMING & FUZING ASSY, FWD SEC	1	MB	.0006	(A) 8L	EX-8810482	2794
1115-01-086-6308CM	FWD SECTION, MK12 RV	1	FB	.0810	(A) 8S	EX-8810483	2794
1115-01-099-6503CM	SERVICE STAR (KIT 1) MK12A	1	MB	.0006	(A) 8L	EX-8810484	2794
1115-01-101-1715CM	SERVICE STAR KIT	N/A	N/A	N/A	1.3C		
1115-01-244-0724CM	JOINT INTER TEST ASSY, MK-11C	1	FB	.0020	1.4S		0323
1135-00-018-7617CM	S & A DEVICE	1	FB	.0042	1.4S	EX-8810485	0349
1135-00-124-2322CM	S & A DEVICE	1	FB	.0042	1.4S	EX-8810486	0349
1135-00-124-5591CM	S & A DEVICE	1	FB	.0042	1.4S	EX-8810487	0349
1135-00-134-7837CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	EX-8810488	0367
1135-00-134-7838CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	EX-8810489	0367
1135-00-150-7415CM	ARMING & FUZING ASSY	1	FB	.0810	(A) 8S	EX-8810490	2794
1135-00-188-6122CM	CABLE ASSY SWITCH	1	FB	.0003	1.4S	EX-8810491	0349
1135-00-415-5366CM	INITIATOR RESERVOIR	1	FB	.0810	(A) 8L	EX-8810493	2796
1135-00-455-2912CM	ARMING & FUZING ASSY	1	FB	.0004	(A) 8L	EX-8810494	2796
1135-00-905-4136CM	AF/ACC ASSY	1	FB	.0042	1.4S	EX-8810498	0367
1135-00-905-4144CM	ARMING & FUZING ATT CONT	1	FB	N/A	1.4S	EX-8810499	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1135-00-930-2118CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	EX-8810500	0367
1135-00-999-4298CM	S & A DEVICE	1	FB	.0042	1.4S	EX-8810501	0349
1135-00-999-5322CM	AF/AC ASSY	1	FB	.0042	1.4S	EX-8810502	0367
1135-01-011-2169CM	TEST SAMPLE, JOINT INTERFACE	1	MB	.0009	1.4S	EX-8810504	0349
1135-01-033-9561CM	EXPL ASSY	1	N/A	N/A	1.4S		0454
1135-01-049-0590CM	MKR	1	N/A	.0012	1.4G		
1135-01-070-6412CM	GEN GAS	1	N/A	.0003	1.4S		
1135-01-078-9388CM	GEN GAS	1	N/A	.0003	1.4S		
1135-01-083-5019CM	ARMING & FUZING ASSY, FWD SEC	1	MB	.0006	(A) 8L	EX-8808599	2796
1135-01-116-3500CM	CABLE CUTTER	1	WB	N/A	1.4S		
1135-01-149-2063CM	MK-11C A&F/AC	1	FB	.0001	1.4S	EX-8810499A	0349
1135-01-190-5477CM	MK21 FUZE	1	MC	.0009	(A) 8S	EX-8808088	1814
1135-01-194-9166	RV REAR COVER	1	WB	*	1.3C	EX-8809059	0186
1135-01-227-5147CM	SWITCH, SQUIB ACTIVATED	4	FB	.0003	1.4S	EX-8704109	0349
1135-01-252-4201CM	BOX 1 OF 3 RE-ENTRY VEHICLE (INERT)	1	WB	N/A	N/A		N/A
1135-01-252-4201CM	BOX 2 OF 3 RV REAR COVER	1	WB	*	1.3C		0186
1135-01-252-4201CM	BOX 3 OF 3 DELAY INITIATOR	*	FB	.0030	1.4S		0454
1135-01-266-2740CM	FUZE/ATTITUDE CONTROL ASSY	1	FB	.0042	1.4S	EX-8810505	0367
1135-01-273-4839CM	FUZE, MK21	1	MC	.0009	(A) 8S		1814
1135-01-318-3893CM	MK-21 RV BUILD-UP SET	1	N/A	*	1.3C	EX-9204075	0186
1145-00-074-1828CM	CTG, IMPULSE	1	FB	.0047	1.4S		
1145-00-443-7976CM	GEN, GAS PRESSURE	1	FB	N/A	1.4S		
1145-00-509-6605CM	GEN GAS	1	N/A	N/A	1.4S		
1145-00-947-9523CM	BOLT, EXPL	1	FB	.0013	1.4S		
1145-01-007-0458CM	GEN, GAS PRESSURE	1	FB	.2316	1.4S		
1145-01-016-7510CM	CABLE ASSY	1	N/A	.0049	1.4S		
1190-01-057-9645CM	REEFING CUTTER & CABLE ASSY	1	FB	.0003	1.4S		
1190-01-102-3589CM	SERVICE STAR SAMPLE KIT	1	FB	.0810	(A) 8S	EX-8810506	2794
1305-00-009-4255	PROJECTILES, 20MM HEI	*	*	.0285	(04)1.1D	EX-8810507	0168
1305-00-028-4556	CTG, 20MM, M96, INC	165	WB	.0775	(04)1.2G	EX-8807613	0009
1305-00-028-6146	CTG, CAL .30, M1	1680	WB	.0021	*1.4S	EX-8807619	0012
1305-00-028-6152	CTG, CAL .30, M1	1600	WB	.0021	*1.4S	EX-8807620	0012
1305-00-028-6157	CTG, CAL .30, M2	1500	WB	.0074	*1.4S	EX-8810508	0012
1305-00-028-6168	CTG, CAL .30, M2	480	WB	.0074	*1.4S	EX-8807622	0012
1305-00-028-6171	CTG, CAL .30, M2	1344	WB	.0074	*1.4S	EX-8807623	0012
1305-00-028-6190	CTG, CAL .30, M2	480	WB	.0074	*1.4S	EX-8807626	0012
1305-00-028-6195	CTG, CAL .30, M2	1500	WB	.0074	*1.4S	EX-8807629	0012
1305-00-028-6207	CTG, CAL .30, M2	1344	WB	.0074	*1.4S	EX-8807630	0012
1305-00-028-6208	CTG, CAL .30, M2	480	WB	.0074	*1.4S	EX-8807631	0012
1305-00-028-6215	CTG, CAL .30, M2	764	WB	.0074	*1.4S	EX-8807632	0012

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
6135-00-056-6863	BATTERY, ELEC	1	FB	.0019	1.4S	Y	XK	OO	0349
6135-00-063-7757	BATTERY	1	FB	.0001	1.4S	Y	XK	OO	0349
6135-00-166-9288	PWR SUPPLY	1	FB	.0386	1.4S	Y	XK	OO	0349
6135-00-416-2898	BATTERY	*	*	.0001	1.4S	Y	XK	OO	0349
6135-00-426-2386	BATTERY	1	FB	.0002	1.4S	X	XX	OO	0349
6135-00-435-1120	BATTERY	1	*	.0001	1.4S	X	XX	OO	0349
6135-00-437-5182	BATTERY	1	MC	.0087	1.4S	Y	XK	OO	0349
6135-00-488-4478	BATTERY	1	FB	.0001	1.4S	X	XX	OO	0349
6135-00-572-5908	BATTERY	N/A	N/A	.0004	1.4S	X	XX	OO	0349
6135-00-655-2279	BATTERY	N/A	N/A	.0001	1.4S	X	XX	OO	0349
6135-00-691-2442CM	ATTITUDE CONT BATTERY	*	*	.0004	1.4S	Y	XK	OO	0349
6135-00-789-2865	BATTERY	1	FB	.0001	1.4S	Y	XK	OO	0349
6135-00-793-1809XJ	BATTERY	N/A	N/A	N/A	1.4S	X	XX	OO	0349
6135-00-819-8073	BATTERY	1	MC	.0001	1.4S	Y	XK	OO	0349
6135-00-819-8074	BATTERY	1	MC	.0001	1.4S	Y	XK	OO	0349
6135-00-824-2772AQ	BATTERY	N/A	N/A	.0001	1.4S	X	XX	OO	0349
6135-00-883-8793AQ	BATTERY	1	FB	.0022	1.4S	X	XX	OO	0349
6135-00-992-8750	BATTERY	N/A	N/A	.0072	1.4S	Y	XK	OO	0349
6135-00-994-5021	BATTERY	N/A	N/A	.0004	1.4S	Y	XK	OO	0349
6135-01-013-8794JB	THERMAL BATTERY	1	FB	.0002	1.4S	X	XX	OO	0349
6135-01-033-3213	BATTERY	15	MB	.0001	1.4S	X	XX	OO	0349
6135-01-054-2462	BATTERY, THERMAL	1	FB	.0002	1.4S	X	XX	OO	0349
6135-01-110-8022	BATTERY, WET, PRIMARY, BA2025/DWW	N/A	N/A	N/A		COR	YJ	CR	2795
6135-01-124-4150	BATTERY	*	FB	1.58	1.4S	X	XX	OO	0349
6135-01-183-8993	BATTERY, THERMAL	15	MB	.0016	1.4S	X	XX	OO	0349
6135-01-185-1057	BATTERY, THERMAL (CMA)	*	WB	.0001	1.4S	X	XX	OO	0349
6135-01-186-2891	THERMAL BATTERY	4	FB	.2032	1.4S	X	XX	OO	0349
6135-01-200-5143	ORDNANCE BATTERY P470	1	FB	.0036	1.4S	Y	XX	OO	0349
6135-01-200-5144	ELECTRONICS BATTERY P471	1	FB	.0041	1.4S	Y	XX	OO	0349
6135-01-218-0433CM	MK21 FUZE BATTERY	1	FB	.0007	1.4S	Y	XX	OO	0349
6135-01-226-6730CM	THERMAL BATTERY POWER SUPPLY	1	FB	.0002	1.4S	X	XX	OO	0349
6135-01-247-4300	BATTERY, PRIMARY	120	FB	.0001	1.4S	Y	XX	OO	0349
6135-01-260-1099	IFSS BATTERY (2AH)	1	MB	.0060	1.4S	Y	XX	OO	0349
6135-01-260-1100	IFSS BATTERY (8AH)	1	MB	.0133	1.4S	Y	XX	OO	0349
6350-00-169-1552	SIGNAL PROCESSOR, TC521	1	FB	.0001	1.4S	X	XX	OO	0349
6350-00-169-1558	SIGNAL PROCESSOR, TC466	1	FB	.0001	1.4S	X	XX	OO	0349
6350-00-169-1559	SIGNAL PROCESSOR, TC472	1	FB	.0001	1.4S	X	XX	OO	0349
6695-01-248-9833	BATTERY INDICATOR	150	FB	.0001	1.4S	C	BJ	C	0173
6920-00-071-5078	GUID MSL TNG, AGM-45A	1	MB	91.7	(08)1.2E	A	CR	A	0182
6920-00-919-5786	GUIDE MSL TNG, AGM-45A	1	MB	.7500	1.4C	C	EA	C	0276
6920-01-166-8374	TGM-65D MISSILE	1	MB	.0001	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
6920-01-238-0123	TGM-65E MISSILE	1	MB	.0001	1.4S	X	XX	OO	0349
6920-01-239-0525	TGM-65D MISSILE	1	MB	.0001	1.4S	X	XX	OO	0349
6920-01-285-1264	TGM-65G MISSILE W/O VTRA	1	MB	.0001	1.4S	X	XX	OO	0349
6920-01-285-1265	TGM-65G MISSILE W/VTRA	1	MB	.0001	1.4S	X	XX	OO	0349
6920-01-286-1489	TGM-65D MISSILE	1	MB	.0001	1.4S	X	XX	OO	0349
6920-01-286-1490	TGM-65D MISSILE	1	MB	.0001	1.4S	X	XX	OO	0349
8475-01-294-5332	RELEASE SYS, MASK	*	FB	.0001	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1427-00-938-2394	GUID & CONT, AIM-9B/E	2	MB	.5500	1.4C	C	EA	C	0276
1427-01-005-4003	GUID & CONT SECT, AIM-7F-5	1	MB	.0767	2.2S	NCG	XD	*NG	1046
1427-01-006-0523	GUID & CONT SECT, AIM-7F	1	MB	.0767	2.2S	NCG	XD	*NG	1046
1427-01-006-0524	GUID & CONT SECT, AIM-7F-4	1	MB	.0767	2.2S	NCG	XD	*NG	1046
1427-01-012-4887	GUID & CONT UNIT	2	MB	.7400	1.4C	C	EA	C	0276
1427-01-015-8956AB	GUID & CONT UNIT, AIM-9	2	MB	.5500	1.4C	C	EA	C	0276
1427-01-022-0113	GUID & CONT UNIT SECT, AIM-7F-5	1	MB	.0750	2.2S	NCG	XD	*NG	1046
1427-01-024-9967	MSL, STINGER, FIM-92A	1	MB	.8500	1.1E	A	CR	A	0181
1427-01-034-3406	GUID & CONT UNIT	1	MB	.0750	2.2S	NCG	XD	NG	1046
1427-01-041-8459	GUID & CONT UNIT	2/4	MB	.0360	1.4C	C	EA	C	0276
1427-01-049-5498	GUID & CONT UNIT	1	MB	.0750	2.2S	NCG	XD	NG	1046
1427-01-068-3184	GUID & CONT UNIT	1	MB	.0750	2.2S	NCG	XD	NG	1046
1427-01-071-8399	GUID & CONT UNIT, AIM-9P	1	MB	.7400	1.4C	C	EA	C	0276
1427-01-072-3601	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	NCG	XD	NG	1046
1427-01-072-3603	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	NCG	XD	NG	1046
1427-01-093-7405	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	NCG	XD	NG	0323
1427-01-093-7406	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	NCG	XD	NG	0323
1427-01-104-3011	GUID & CONT SECT	2	MB	.7400	1.4C	C	EA	C	0276
1427-01-104-3012	GUID & CONT SECT	2	MB	.7400	1.4C	C	EA	C	0276
1427-01-114-2054	GUID & CONT UNIT, WGU-4A/B	2/4	MB	.0360	1.4C	C	EA	C	0276
1427-01-133-7443	TGT SEEKER, RADOME	1	MB	.0136	1.4S	C	EA	C	0323
1427-01-133-7467	GUID & CONT, AIM-7M	1	MB	.0750	2.2S	NCG	XD	NG	1046
1427-01-133-7468	GUID & CONT, AIM-7M	1	MB	.0750	2.2S	NCG	XD	NG	1046
1427-01-134-0919	FLT CONT GP, OA-8878D/D	1	MB	.0070	1.4S	NCG	XD	NG	0349
1427-01-140-8514	GUID & CONT, AIM-9P	2	MB	.7400	1.4C	C	EA	C	0276
1427-01-140-8515	GUID & CONT, AIM-9P	2	MB	.7400	1.4C	C	EA	C	0276
1427-01-149-3504	GUID & RADOME ASSY	1	MB	.0133	1.4S	X	XX	OO	0349
1427-01-276-0428	GUID & CONT, AIM-7M(H)	1	MB	.0750	2.2S	NCG	XD	NG	1046
1427-01-281-5623	STAGE IV (MX)	1	MB	.1855	1.3L	B	XF	MM	0250
1427-01-329-6322	GUID & CONT UNIT WGU-4D/B	2/4	MB	.0360	1.4C	C	EA	C	0276
1560-00-215-2116	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-00-215-2119	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-00-215-2120	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-00-215-2121	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-00-835-1326	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-00-835-1337	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-00-835-1356	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-00-835-1533	PRESSURE SOURCE, F-111	1	FB	.0001	2.2S	NCG	XB	*NG	1066
1560-01-042-3217	CANOPY ASSY	1	WB	.0250	1.4S	X	XX	OO	0349
1560-01-086-1328	CANOPY ASSY	1	WB	.0230	1.4S	X	XX	OO	0349
1560-01-147-1526	CANOPY ASSY	1	WB	.0250	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	DOD HAZARD CLASS DOT CODES MKG 8	DOD HAZARD CLASS DOT CODES LAB 9	DOD HAZARD CLASS DOT CODES SER 10
1560-01-147-1527	CANOPY ASSY	1	WB	.0230	1.4S	X	XX	OO	0349
1560-01-163-1733	CANOPY ASSY	1	WB	.0230	1.4S	X	XX	OO	0349
1560-01-164-6510	CANOPY ASSY	1	WB	.0230	1.4S	X	XX	OO	0349
1560-01-165-2041	CANOPY ASSY	1	WB	.0230	1.4S	X	XX	OO	0349
1560-01-167-5199	CANOPY ASSY	1	WB	.0250	1.4S	X	XX	OO	0349
1560-01-168-3575	CANOPY ASSY	1	WB	.0250	1.4S	X	XX	OO	0349
1660-00-236-2037	CANDLE, OXY GEN ASSY, C-5A (E)	1	FB	1.2	1.4G	OM	XA8	*OM	0336
1660-00-431-7644	GEN ASSY, OXY, C-5A (E)	1	FB	1.2	1.4G	OM	XA8	*OM	0336
1670-00-079-0983	DRAG PARA ASSY (MARS)	1	MB	.0078	1.4S	X	XX	OO	0349
1670-00-204-5759	PARA ASSY, F-111	1	WC	.0027	1.4S	X	XX	OO	0349
1670-00-406-5715	MK8A, PARA ASSY	1	FB	.0003	1.4S	X	XX	OO	0349
1670-00-432-9991	PARA ASSY	1	MB	.0362	1.4S	X	XX	OO	0349
1670-00-448-3968	MAIN RECOVERY PARA	1	MB	.0362	1.4S	C	BG	C	0349
1670-00-459-7659	ENGAGEMENT PARA	1	MB	.0078	1.4S	C	BG	C	0349
1670-01-040-8490	MID-AIR RECOVERY PARA	1	FB	.0298	1.4S	X	XX	OO	0349
1670-01-059-8149	MID-AIR RETRIEVAL PARA SYS	N/A	N/A	.0288	1.4S	X	XX	OO	0349
1670-01-077-1300	MID-AIR RETRIEVAL PARA SYS	N/A	N/A	N/A	1.4S	X	XX	OO	0349
1670-01-140-8634	PARACHUTE, FLIGHT TERM AGM-86	1	WB	.0152	1.4C	C	EA	C	0276
1670-01-149-7547	PARACHUTE, RECOVERY AGM-86	1	WB	.0197	1.4C	C	EA	C	0276
1670-01-180-5593	PARACHUTE, TRAINER AGM-86	1	FB	.0013	1.4C	C	EA	C	0276
1670-01-180-5594	PARACHUTE, TRAINER AGM-86	1	FB	.0013	1.4C	C	EA	C	0276
1670-01-180-5595	MID-AIR RECOVERY SYS AGM-86	1	FB	.0004	1.4C	C	EA	C	0276
1670-01-180-5900	MID-AIR RECOVERY SYS AGM-86	1	FB	.0004	1.4C	C	EA	C	0276
1680-01-053-8604LS	RECOVERY SEQUENCER ASSY	N/A	N/A	N/A	1.4S	X	XX	OO	0323
1680-01-053-9320LS	RECOVERY SEQUENCER ASSY	N/A	N/A	N/A	1.4S	X	XX	OO	0323
1820-00-242-1418	FWD SECT PAYLOAD, LGM-30	1	WB	.0362	1.4C	C	EA	C	0276
1820-00-242-1419	AFT SECT PAYLOAD, LGM-30	1	MB	.1075	1.4C	C	EA	C	0276
1820-01-142-6596	AFT SECT PAYLOAD, LGM-30	1	MB	.1075	1.4C	C	EA	C	0276
2845-00-406-5844	FUEL TANK W/ISO VALVE	1	MB	N/A	**	FL	YA	*MP	
2845-00-406-5845	OXY TANK W/ISO VALVE	1	MB	N/A	*	PA	YB	*MQ	
2915-00-893-2889	CYL, GAS, ETHYLENE OXIDE	1	WB	2.0	***	FL	YD	*FL	
2915-01-120-1885	VALVE, SERVICE	*	FB	.0009	1.4S	C	EA	C	0323
4210-00-880-3815	ELEC DISCHARGE PLUG	1	FB	.0016	1.4S	C	XV	C	0349
5320-00-543-2942	EXPL RIVETS	500	FB	.0002	1.4S	C	YE	OO	0174
5320-00-619-3706	EXPL RIVETS	1000	FB	.0002	1.4S	C	YE	OO	0174
5320-00-619-3794	EXPL RIVETS	500	FB	.0002	1.4S	C	YE	OO	0174
6130-00-493-6629CM	POWER SUPPLY, MK12 RV	10	FB	.0810	1.4L	COR	YF	*CR	2794
6130-01-113-1265CM	POWER SUPPLY, ARMING & FUZING	12	FB	.0010	1.4L	COR	YF	CR	2796
6130-01-195-0891CM	POWER SUPPLY, ARMING & FUZING	12	FB	.0010	8L	COR	YF	CR	2794
6130-01-293-4146CM	POWER SUPPLY, ARMING & FUZING	12	FB	.0010	8L	COR	YF	CR	2794
6135-00-009-4100	BATTERY	*	*	.0001	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1420-01-101-8233	TGT DET DEVICE, DSU-15A/B	4	MB	.0039	1.4S	X	XX	OO	0349
1420-01-119-4589	VALVE ASSY	*	FB	.0005	1.4S	C	EA	C	0323
1420-01-149-3510	CONTROL SECTION, WCU-5/B, A/B	1	MB	.0007	1.4S	NCG	XX	NG	0323
1420-01-161-2090	CONTROL MODULE WCU-2/B	1	MB	.0044	1.4S	Y	XX	OO	0323
1420-01-170-1415	COMPUTER GP WCU-10/B	1	MB	.9610	1.4C	C	EA	C	0276
1420-01-183-7498	TANK HOUSING & SERVO ASSY	1	FB	.7717	1.4C	C	EA	C	0276
1420-01-200-5145	IN-FLIGHT COOLANT ASSY	1	WB	.0036	2.2S	NCG	YS	NG	1078
1420-01-205-8311	AFT SHROUD STRUCTURE ASSY	1	WB	.0505	1.4C	C	BB	C	0351
1420-01-241-5790	CONTROL SECTION WCU-2/B	1	MB	.0044	1.4S	X	XX	00	0349
1425-01-024-9982	MSL, STINGER, FIM-92A	1	MB	.8500	1.1E	A	CR	A	0181
1427-00-326-3308	GUID & CONT SECT, AIM-7E	1	MB	1.6	2.2S	NCG	XD	*NG	1046
1427-00-442-1654	GUID & CONT UNIT, AIM-9J	2	MB	.7400	1.4C	C	EA	C	0276
1427-00-603-5439	GUID & CONT, AIM-9J	2	MB	.7400	1.4C	C	EA	C	0276
1427-00-782-9763	GUID & CONT, AIM-7	1	MB	1.6	2.2S	NCG	XD	*NG	1046
1427-00-786-1266	GUID & CONT, AIM-7	1	MB	.7500	2.2S	NCG	XD	*NG	1046
1427-00-874-5760	GUID & CONT, AIM-9B	1	MB	.5500	1.4C	C	EA	C	0276

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1410-00-125-6760	MSL, AGM-65B	1	*	85.0	1.1E	A	CR	A	0181
1410-00-138-2910	AGM-65/A	1	*	85.0	1.1E	A	CR	A	0181
1410-00-196-6099	AIM-4A/D	1	MB	2.5	(04)1.2E	A	CR	A	0182
1410-00-196-6100	AIM-4F	1	MB	5.0	(04)1.2E	A	CR	A	0182
1410-00-196-6101	AIM-4G	1	MB	5.0	(04)1.2E	A	CR	A	0182
1410-00-196-6103	AIM-4A/D	1	MB	2.5	(04)1.2E	A	CR	A	0182
1410-00-196-6104	AIM-4A/D-2	1	MB	2.5	(04)1.2E	A	CR	A	0182
1410-00-196-6105	AIM-4A/D-9	1	MB	2.5	(04)1.2E	A	CR	A	0182
1410-00-238-1486	AGM-65/A	1	*	85.0	1.1E	A	CR	A	0181

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-272-4400	CABLE MECHANISM ASSY, DM	1	FB	.0047	1.4S	C	BG	C	0070
1377-01-274-2394	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-274-5537	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-274-5538	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-274-5539	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-274-5540	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-274-5541	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-274-5542	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-274-5543	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-274-5544	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-274-5545	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-274-5546	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-274-9631	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-275-1658	EXPLOSIVE KIT E (F-111)	1	WB	.1610	1.4S	C	BB	C	0367
1377-01-275-1760	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-276-6496	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-276-6497	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-276-6498	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-276-6499	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-276-6500	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-276-7808	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-276-7809	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-276-7810	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-277-1221	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-277-2868	CTG ASSY (AFSEAWARS)	*	FB	.0002	1.4S	X	XX	OO	0349
1377-01-277-2869	CTG ASSY (AFSEAWARS)	*	FB	.0002	1.4S	X	XX	OO	0349
1377-01-279-7177	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-279-7178	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-279-9506	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-281-4913	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-282-4676	CTG, IMPULSE, MK107 MOD 1	4	MB	.0569	1.4C	C	DC	OO	0276
1377-01-283-6741	CTG, IMPULSE CCU-106/B	80	WB	.0234	1.4C	C	DC	OO	0276
1377-01-284-1948	CTG, IMPULSE CCU-107/B	80	WB	.0100	1.4C	C	DC	OO	0276
1377-01-285-3106	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-287-4174	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-01-289-4632	INITIATOR	1	FB	.0013	1.4C	C	EA	C	0276
1377-01-290-1751	CTG, IMPULSE, CCU-91/B	4	MC	.0418	1.4C	C	EA	C	0276
1377-01-290-6883	CATAPULT, ROCKET	1	WB	12.7	1.3C	B	EM	B	0186
1377-01-290-6884	CATAPULT, ROCKET	1	WB	12.7	1.3C	B	EM	B	0186
1377-01-285-3106	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-294-8911	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-299-9862	ACTUATOR KIT	1	FB	.0018	1.4S	X	XX	OO	0349
1377-01-314-5162	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-314-5163	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-314-5164	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-314-5165	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-318-1830	RKT MTR, VERNIER	1	WB	1.1	1.3C	B	EM	B	0186
1377-01-318-7692	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-318-7693	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-318-7694	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-318-7696	TIME DELAY INIT, 2.0 SEC	*	FB	.0077	1.4C	C	DC	OO	0276
1377-01-318-7697	TIME DELAY INIT, 1.5 SEC	*	FB	.0077	1.4C	C	DC	OO	0276
1377-01-319-3847	GAS GENERATOR, GYRO SPIN-UP	1	FB	.0111	1.4C	C	EA	C	0276
1377-01-322-6334	CTG, MORTAR	1	FB	.0140	1.4C	C	EA	C	0276
1377-01-327-7872	RKT MTR, CANOPY JET	1	FB	.6879	1.3C	B	EM	B	0186
1377-01-327-7873	RKT MTR, CANOPY JET	1	FB	.6879	1.3C	B	EM	B	0186
1377-01-332-2379	CUTTER, REEFING LINE	1	FB	.0024	1.4S	C	BG	C	0070
1377-01-333-3503	CTG, ACFT FIRE EXTINGUISHER	1	FB	.0009	1.4S	C	XV	C	0323
1377-01-340-3042	CATAPULT	1	WB	.2488	1.4C	C	EA	C	0276
1377-01-346-2215	INITIATOR	*	FB	.0033	1.4C	C	EA	C	0276
1377-01-346-2216	INITIATOR	*	FB	.0044	1.4C	C	EA	C	0276
1377-01-346-2217	INITIATOR	*	FB	.0066	1.4C	C	EA	C	0276
1377-01-346-2218	INITIATOR	*	FB	.0066	1.4C	C	EA	C	0276
1377-01-346-2219	INITIATOR, 1.0 SEC	1	FB	.0098	1.4C	C	EA	C	0276
1377-01-346-2220	INITIATOR, .33 SEC	1	FB	.0098	1.4C	C	EA	C	0276
1377-01-346-2221	INITIATOR, .40 SEC	1	FB	.0098	1.4C	C	EA	C	0276
1377-01-360-4900	CTG, DELAY, 0.25 SEC	*	*	.0005	1.4S	C	DC	OO	0012
1377-01-360-4901	CTG, DELAY, 0.5 SEC	*	*	.0005	1.4S	C	DC	OO	0012
1377-01-360-4902	CTG, DELAY, 0.75 SEC	*	*	.0005	1.4S	C	DC	OO	0012
1377-01-360-4903	CTG, DELAY, 1.0 SEC	*	*	.0005	1.4S	C	DC	OO	0012
1377-01-360-4904	CTG, DELAY, 4.0 SEC	*	*	.0005	1.4S	C	DC	OO	0012
1377-01-364-3955	CANOPY REMOVER, RAU-3/A	1	FB	.0500	1.4S	C	EA	C	0323
1377-01-369-2492	CTG, IMPULSE, ARD863-1A1W	8	MC	.0090	1.4C	C	DC	OO	0276
1377-01-369-6045	CTG, IMPULSE, ARD446-1A1W	4	MC	.0276	1.4C	C	DC	OO	0276
1385-00-605-0253	CTG, IMPULSE	12	MB	.0243	1.4C	C	DC	OO	0276
1385-00-896-3694	CTG, IMPULSE	84	MB	.0243	1.4C	C	DC	OO	0276
1390-00-187-5392	FUZE, POINT DET M557	16	WC	.0300	1.1B	A	AZ	A	0106
1390-00-764-9124	FUZE, PROX, M532	16	WC	.0176	1.1B	A	AZ	A	0106
1390-00-892-4302	FUZE, POINT DET	16	WC	.0300	1.1B	A	AZ	A	0106
1390-00-980-0494	PRIMER, ELEC	N/A	N/A	.0004	1.4B	C	DE	C	0378
1390-01-054-1527	PRIMER, M42-5086	N/A	N/A	N/A	1.4B	C	DE	C	0378
1390-01-054-5137	PRIMER, M92A1	112	FB	.0003	1.4S	C	DE	OO	0044

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-234-0706	DROGUE, FLSA SEVERANCE	*	FB	.0007	1.4D	C	BB	C	0237
1377-01-234-6207	CABLE CUTTER, RETENTION RELEASE SYSTEM	*	FB	.0024	1.4S	C	BG	C	0070
1377-01-234-8510	INITIATOR, SMDC/CDC	*	FB	.0023	1.4C	C	BB	C	0276
1377-01-234-8671	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-234-8672	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-235-1046	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-236-3516	LINEAR CHARGE ASSY (TYPE I)	2	WB	.0794	1.4D	C	BB	C	0410
1377-01-236-3517	LINEAR CHARGE ASSY (TYPE II)	2	WB	.0794	1.4D	C	BB	C	0410
1377-01-237-2343	CTG, DISCHARGE	*	FB	.0072	1.4S	C	XV	C	0323
1377-01-237-4417	MODE SELECTOR	1	FB	.0013	1.4S	C	BJ	C	0173
1377-01-238-3644	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-240-3600	DET TRANSFER ASSY	1	FB	.0009	1.4S	C	BB	C	0367
1377-01-241-7982	CONNECTOR, EXPLO TRANSFER	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-241-8045	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-241-8046	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-241-8047	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-241-8048	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-241-8049	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-241-8050	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-241-8149	TIME DELAY, 75 SECONDS	*	FB	.0034	1.4S	C	BB	C	0367
1377-01-241-8150	TIME DELAY, .35 SECOND	*	FB	.0018	1.4S	C	BB	C	0367
1377-01-242-2036	ONE-WAY TRANSFER	*	FB	.0013	1.4S	X	XX	OO	0384
1377-01-242-4838	CUTTER, ROD END	*	WB	.0007	1.4S	C	BG	C	0070
1377-01-243-0320	CONNECTOR, EXPLO TRANSFER	*	FB	.0010	1.4S	C	BB	C	0367
1377-01-243-0321	CONNECTOR, EXPLO TRANSFER	*	FB	.0004	1.4S	C	BB	C	0367
1377-01-243-0322	CONNECTOR, EXPLO TRANSFER	*	FB	.0004	1.4S	C	BB	C	0367
1377-01-243-0323	CONNECTOR, EXPLO TRANSFER	*	FB	.0010	1.4S	C	BB	C	0367
1377-01-244-4117	INITIATOR, LAUNCH BLEED-DOWN VALVE	*	FB	.0003	1.4C	C	BE	C	0351
1377-01-246-1728	INITIATOR, DELAY	*	FB	.0030	1.4S	C	BW	C	0454
1377-01-248-6391	CABLE MECHANISM ASSY, STAGE II	1	FB	.0047	1.4S	C	BG	C	0070
1377-01-248-8709	CABLE CUTTER, LAUNCH SEAL	1	FB	.0024	1.4S	C	BG	C	0070
1377-01-250-1291	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-250-1292	DET TRANSFER ASSY	1	FB	.0015	1.4S	C	BB	C	0367
1377-01-250-1293	DET TRANSFER ASSY	1	FB	.0015	1.4S	C	BB	C	0367
1377-01-251-8522	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-251-8523	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1377-01-251-8524	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-251-8525	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-251-8526	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-251-8527	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-251-8528	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-251-8529	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-251-8530	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-251-8531	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-251-8532	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-251-8533	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-251-8534	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-251-8535	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-251-8536	CORD ASSY, DET	1	FB	.0010	1.4S	X	XX	OO	0349
1377-01-251-8537	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-251-8538	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-251-8539	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-251-8540	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-251-8541	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-251-8542	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-251-8543	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-252-7039	CORD ASSY, DET	1	FB	.0009	1.4S	X	XX	OO	0349
1377-01-252-9821	CORD ASSY, DET	1	FB	.0008	1.4S	X	XX	OO	0349
1377-01-252-9822	CORD ASSY, DET	1	FB	.0006	1.4S	X	XX	OO	0349
1377-01-254-4714	CORD ASSY, DET	1	FB	.0007	1.4S	X	XX	OO	0349
1377-01-254-8611	CORD ASSY DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-254-8612	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-254-8613	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	C	BB	C	0367
1377-01-255-1598	CTG, FIRE EXTINGUISHER	*	FB	.0009	1.4S	C	XV	C	0323
1377-01-255-1650	RKT MTR	1	WB	1.1	1.3C	B	EM	B	0186
1377-01-255-2382	CTG, FIRE EXTINGUISHER	*	FB	.0009	1.4S	C	XV	C	0323
1377-01-257-9467	INITIATOR	1	FB	.0006	1.4C	C	BB	C	0276
1377-01-260-6410	INITIATOR	*	FB	.0044	1.4C	C	EA	C	0276
1377-01-262-0521	INITIATOR	1	FB	.0005	1.4C	C	BB	C	0276
1377-01-269-8061	INITIATOR	*	FB	.0023	1.4C	C	EA	C	0276
1377-01-271-5483	AND GATE, TYPE 1	*	FB	.0003	1.4S	C	BJ	C	0173
1377-01-271-5484	AND GATE, TYPE 2	*	FB	.0003	1.4S	C	BJ	C	0173
1377-01-271-5485	AND GATE, TYPE 3	*	FB	.0003	1.4S	C	BJ	C	0173
1377-01-271-7161	INITIATOR	1	FB	.0006	1.4C	C	BB	C	0276
1377-01-271-9072	EXPLOSIVE TRANSFER, ONE-WAY	*	FB	.0013	1.4S	X	XX	OO	0384
1377-01-272-4399	CABLE MECHANISM ASSY, STAGE I	1	FB	.0047	1.4S	C	BG	C	0070

Pages 3-78A and 3-78B are deleted in their entirety.

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-233-2699	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-233-2700	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2701	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-233-2702	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6		DOT CONT NO. 7	UN SER NO. & MKG 8
1325-00-448-8867	BOMB, FRAG		6	WB	4.6		1.1D	EX-8806633	0034
1325-00-450-0696	COMPUTER GROUP		4	MB	.9610		1.4S	EX-8810681	0323
1325-00-451-6958	FUZE, BOMB, FMU-81		12	WB	.0007		1.4D	EX-8810682	0410
1325-00-453-9878	MANIFOLD, GUIDED BOMB		1	WB	.9602		1.4B	EX-8810683	0350
1325-00-453-9903	CONTROL, GUIDED BOMB		1	MB	.9610		1.4S	EX-8810684	0323
1325-00-454-0028	CABLE, ASSY		1	FB	.0008		1.4S	EX-8810685	0349
1325-00-458-5179	BOOSTER FUZE		200	WB	.0100		1.3C	EX-8810686	0275
1325-00-460-1305	BOMB, G.P., MK82		6	PL	192.0		1.1D	EX-8806634	0034
1325-00-464-7369	BOMB, G.P., MK83		3	PL	445.0		1.1D	EX-8806635	0034
1325-00-467-0952	ADAPTER, DISP, ADU-373A/B		1	MC	.0008		1.4S	EX-8810687	0349
1325-00-471-1199	INITIATOR, FMU-7C/B		14	WB	.0016		1.4S	EX-8810688	0349
1325-00-471-4158	FUZE, BOMB, FMU-7C/B		14	WB	.0022		(04)1.2D	EX-8806638	0409
1325-00-477-2053	DISP & BOMB, CBU-52B/B		2	WC	146.0		(04)1.2D	EX-8806639	0035
1325-00-477-2058	DISP & BOMB, CBU-58/B		2	MB	158.0		(04)1.2D	EX-8806640	0035
1325-00-477-2059	DISP & BOMB, CBU-58/B		2	MB	158.0		(04)1.2D	EX-8806641	0035
1325-00-477-3758	CMPTR CONTROL GROUP, MAU-169/B		4	MB	.9610		1.4S	EX-8810689	0323
1325-00-478-8965	DISP & BOMB, CBU-14A(T-2)/A		2	MB	.1500		1.4S	EX-8810690	0349
1325-00-478-8966	DISP & BOMB, CBU-14A(T-1)/A		2	MB	.1500		1.4S	EX-8810691	0349
1325-00-483-3036	BOMB, CHEM, BLU-27B/B	(D)	1	WC	717.0	(D)	3J	EX-8806645	1993
1325-00-486-6249	LEAD EXPL		N/A	N/A	.0001		1.1D	EX-8810692	0065
1325-00-489-1575	COMPUTER, BOMB		1	FB	.0016		****1.4S	EX-8810693	0349
1325-00-489-1576	CONTROL, GUIDED BOMB		1	FB	.9610		1.4S	EX-8810694	0323
1325-00-489-1577	CABLE & BATTERY, ASSY		1	FB	.0008		1.4S	EX-8810695	0349
1325-00-491-6140	DISP & BOMB, MK20 MOD 4 (T-2)		1	MB	.0639		1.4S	EX-8806647	0349
1325-00-495-5413	ADAPTER BOOSTER, M148		30	WB	.3900		1.1D	EX-8806649	0042
1325-00-529-7684	EXTENSION, FUZE, BOMB, M1		10	WB	1.0		1.1D	EX-8806652	0043
1325-00-540-7629	BOMB, G.P., MK82		6	PL	192.0		1.1D	EX-8806653	0034
1325-00-541-0190	BOMB, G.P., MK84		2	PL	945.0		1.1D	EX-8806654	0034
1325-00-553-4790	DISP & BOMB, CBU-75A/B		2	MB	419.8		(12)1.2D	EX-8810697	0035
1325-00-554-1173	BOMB, GAS, MC-1, GB	(A)	2	PL		(E)	6.1K	EX-8810698	2016
1325-00-554-1431	CHG, SPOTTING		10	WB	6.0		1.1D	EX-8806655	0027
1325-00-570-2498	FUZE, BOMB, FMU-7A/B		14	WB	.0022		(04)1.2D	EX-8806657	0409
1325-00-570-2528	INITIATOR, FMU-7A/B		14	WB	.0016		1.4S	EX-8810699	0349
1325-00-585-9057	FUZE, BOMB, M905		30	WB	.0150		(04)1.2D	EX-8810700	0409
1325-00-585-9287	DELAY ELEMENT, FUZE, M9		240	WB	.0002		1.4S	EX-8806658	0367
1325-00-585-9288	DELAY ELEMENT, FUZE, M9		240	WB	.0002		1.4S	EX-8806659	0367
1325-00-585-9289	DELAY ELEMENT, FUZE, M9		240	WB	.0002		1.4S	EX-8806660	0367
1325-00-585-9290	DELAY ELEMENT, FUZE, M9		240	WB	.0002		1.4S	EX-8806661	0367
1325-00-585-9579	DELAY ELEMENT, FUZE, M9		240	WB	.0002		1.4S	EX-8806662	0367
1325-00-585-9580	DELAY ELEMENT, FUZE, M9		240	WB	.0002		1.4S	EX-8806663	0367
1325-00-596-9999	BOMB, G.P., MK81		12	PL	100.0		1.1D	EX-8806664	0034

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHIP CNTR #RDS 3	SHIP CNTR TYPE 4	SHIP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1325-00-603-9814	FUZE, BOMB		10	WB	.0008	1.4D	EX-8806665	0410
1325-00-613-0484	FUZE, FMU-54A/B		12	WB	.3600	(04)1.2D	EX-8810701	0409
1325-00-623-6379	ADAPTER BOOSTER		20	WB	.0130	1.1D	EX-8806666	0042
1325-00-710-6765	BOMB, G.P., MK84		2	PL	945.0	1.1D	EX-8806668	0034
1325-00-710-6768	BOMB, G.P., MK82		6	PL	192.0	1.1D	EX-8806669	0034
1325-00-710-6771	BOMB, G.P., MK81		12	PL	100.0	1.1D	EX-8806670	0034
1325-00-716-1443	BURSTER, BOMB, M32		3	WB	15.0	1.1D	EX-8806674	0043
1325-00-726-2976	DISP & BOMB, CBU-38B/A		1	MB	183.0	1.1D	EX-8810702	0034
1325-00-729-4384	FUZE, BOMB, M907		12	WB	.0150	(04)1.2D	EX-8806675	0409
1325-00-756-2183	FUZE, BOMB, M904		30	WB	.1650	1.1D	EX-8806676	0408
1325-00-756-2184	FUZE, BOMB, M905		15	WB	.0150	(04)1.2D	EX-8806677	0409
1325-00-781-9624	DISP & BOMB, CBU-46/A		1	MB	117.7	(12)1.2D	EX-8810703	0035
1325-00-781-9986	BOMB, CHEM, BLU-52A/B, CS-2	(B)	1	WB	250.0	(C) 6.1G	EX-8806678	2017
1325-00-809-1476	DISP & BOMB		1	WC	117.0	(12)1.2D	EX-8810704	0035
1325-00-809-2568	DISP & BOMB, CBU-49B/A		1	MB	123.0	(12)1.2D	EX-8806680	0035
1325-00-809-2569	DISP & BOMB, CBU-49C/B		1	MB	117.0	(12)1.2D	EX-8806681	0035
1325-00-809-2680	FUZE, BOMB		6	WB	.0007	1.4D	EX-8806682	0410
1325-00-827-3851	ADAPTER BOOSTER, M148		12	WB	.3900	1.1D	EX-8806683	0042
1325-00-827-4020	FUZE, BOMB, M905		30	WB	.0150	(04)1.2D	EX-8806684	0409
1325-00-827-4029	FUZE, BOMB, M904E2		30	WB	.1650	1.1D	EX-8806685	0408
1325-00-832-8310	FUZE, BOMB		28	WB	.0022	(04)1.2D	EX-8806686	0409
1325-00-871-4695	INITIATOR ASSY, BOMB, FMU-7B		14	WB	.0016	1.4S	EX-8810705	0349
1325-00-871-4697	FUZE ASSY, BOMB, FMU-7B		14	WB	.0022	(04)1.2D	EX-8806689	0409
1325-00-879-2644	FUZE, BOMB, FMU-26A/B		6	WB	.0007	1.4D	EX-8810706	0410
1325-00-879-2645	BOOSTER, FUZE, FZU-1/B		200	WB	.0100	1.3C	EX-8810709	0275
1325-00-879-3993	DISP & BOMB, CBU-30/A, CS	(B)	1	MB	110.0	(F) 1.3G	EX-8806692	0019
1325-00-883-5310	DISP & BOMB, CBU-38(T-1)/A		1	MB	.1800	1.4S	EX-8810710	0349
1325-00-883-5312	DISP & BOMB, CBU-38A(T-2)/A		1	MB	.1700	1.4S	EX-8810711	0349
1325-00-891-5439	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	EX-8810712	0367
1325-00-891-5440	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	EX-8810713	0367
1325-00-891-5441	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	EX-8806694	0367
1325-00-891-5442	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	EX-8806695	0367
1325-00-891-5443	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	EX-8806696	0367
1325-00-891-5444	DELAY ELEMENT, FUZE, M9		240	WB	.0002	1.4S	EX-8810714	0367
1325-00-894-0230	CTG, ASSY		100	FB	.0003	1.4S	EX-8810715	0323
1325-00-895-3874	DISP & BOMB, CBU-25A/A		1	MB	35.0	(04)1.2D	EX-8806697	0035
1325-00-900-5542	TANK, SPRAY, LIQUID, AGENT	(A)	1	MB		(E) 6.1K	EX-8810716	2016
1325-00-900-8590	DISP & BOMB, CBU-12/A, WP	(C)	1	MB	234.3	(04)1.2H	EX-8810717	0245
1325-00-904-9383	BOMB, BLU-24/B		N/A	N/A	.26	(12)1.2D	EX-8806698	0035

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1325-00-912-4052	DISP & BOMB, CBU-22/A (C)	2	MB	79.2	(04)1.2H	EX-8806699	0245
1325-00-925-4444	DISP & BOMB, CBU-14A/A	2	MB	40.3	(12)1.2D	EX-8806702	0035
1325-00-926-1856	ADAPTER BOOSTER, T45E4	8	WB	.3900	1.1D	EX-8806703	0042
1325-00-926-1868	BOMB, G.P., M117	2	PL	386.0	1.1D	EX-8806704	0034
1325-00-926-1895	FUZE, BOMB, M904	30	WB	.1650	1.1D	EX-8806706	0408
1325-00-926-3954	ADAPTER BOOSTER, M148	8	WB	.3900	1.1D	EX-8806707	0042
1325-00-926-3988	ADAPTER BOOSTER	8	WB	.4400	1.1D	EX-8806709	0042
1325-00-926-4010	BOMB, CLUSTER, FRAG, M1A4	1	MB	16.2	(12)1.1D	EX-8806710	0034
1325-00-926-4082	ADAPTER BOOSTER	30	WB	.8800	1.1D	EX-8810720	0042
1325-00-926-4084	ADAPTER BOOSTER	6	WB	.8800	1.1D	EX-8810721	0042
1325-00-926-9321	DISP & BOMB, CBU-14A/A	2	MB	40.3	(12)1.2D	EX-8810724	0035
1325-00-926-9356	INITIATOR	14	WB	.0016	1.4S	EX-8810725	0349
1325-00-926-9401	FUZE, BOMB, M907E2	12	WB	.0150	(04)1.2D	EX-8806711	0409
1325-00-926-9402	FUZE, BOMB, M907E2	12	MB	.0150	(04)1.2D	EX-8806712	0409
1325-00-933-4954	DISP & BOMB, CBU-25A/A	2	MB	35.0	(04)1.2D	EX-8806714	0035
1325-00-935-2070	ADAPTER BOOSTER, M147	30	WB	.8800	1.1D	EX-8806717	0042
1325-00-935-6039	BOMB, CHEM, BLU-52/B, CS-1 (B)	1	WC	250.0	(C) 6.1G	EX-8806718	2017
1325-00-935-6085	ADAPTER BOOSTER, M147	6	WB	.8800	1.1D	EX-8810726	0042
1325-00-935-6137	EXTENSION, FUZE, BOMB, M1A1	10	WB	2.0	1.1D	EX-8806720	0043
1325-00-935-9135	BOMB, G.P., M118	1	PL	1993	1.1D	EX-8806722	0034
1325-00-935-9174	BOMB, G.P., MK82	6	PL	192.0	1.1D	EX-8806723	0034
1325-00-935-9184	DISP & BOMB, CBU-49B/B	1	WC	123.0	(12)1.2D	EX-8806724	0035
1325-00-935-9217	BOMB, G.P., M117	2	PL	386.0	1.1D	EX-8806725	0034
1325-00-937-2139	BOMB, G.P., MK84	2	PL	945.0	1.1D	EX-8806727	0034
1325-00-938-1937	TGT, DETECTING DEVICE	5	MC	N/A	1.4S	EX-8806728	0349
1325-00-938-6984	FUZE, BOMB, FMU-54/B	15	WB	.3430	1.4D	EX-8806729	0410
1325-00-947-7617	BOOSTER & TAPER ASSY	100	WB	.0992	1.1D	EX-8806172	0042
1325-00-949-5421	DISP & BOMB, CBU-22A/A, WP (C)	2	MB	79.2	(04)1.2H	EX-8810728	0245
1325-00-965-0855	FUZE, BOMB, M904E2	30	WB	.1650	1.1D	EX-8806731	0408
1325-01-006-0059	CBU-MK20 MOD 3	2	MB	100.0	1.1D	EX-8810731	0034
1325-01-009-0462	CUTTER ASSY	*	*	.0145	1.4S	EX-8810732	0070
1325-01-012-1989	FUZE, FMU-110/B	2	MB	.0120	1.4D	EX-8810733	0410
1325-01-012-1990	FUZE, FMU-113/B	2	MB	.0020	1.4S	EX-8810734	0349
1325-01-033-9895	BOMB, G.P., MK84	2	PL	945.0	1.1D	EX-8803463	0034
1325-01-034-6017	DISP & BOMB, CBU-75B/B	2	MB	419.75	(12)1.2D	EX-8810735	0035
1325-01-038-4733	DISP & BOMB, CBU-58A/B	2	MB	148	(04)1.2D	EX-8810736	0035
1325-01-038-4734	DISP & BOMB, CBU-71A/B	2	MB	148	(04)1.2D	EX-8810737	0035
1325-01-041-2291	CONT GUIDED BOMB	1	FB	.9610	1.4C	EX-8810738	0276
1325-01-042-7928	MANIFOLD ASSY	1	*	.9602	1.4C	EX-8810739	0276
1325-01-042-7929	CABLE & BATTERY	1	*	.0008	1.4S	EX-8810740	0349
1325-01-042-9735	DET ELEC, M36A1	1	N/A	.0007	1.1B	EX-8810741	0073

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1325-01-055-0358	ADAPTER KIT, ADU-449/B	20	WB	.0083	1.4C	EX-8810742	0276
1325-01-056-0824	FUZE, MK339 MOD 1	1	FB	.0006	1.4D	EX-8810743	0410
1325-01-061-4192	FUZE, FMU-124A/B	1	MC	.2712	1.4D	EX-8808605	0410
1325-01-064-0853	BOMB, G.P., MK82	6	PL	192	1.1D	EX-8810744	0034
1325-01-066-7965	COMPUTER CONT GP, MAU-169A/B	4	MB	.9610	1.4S	EX-8810745	0323
1325-01-079-6248	COMPUTER CONT GP, MAU-169B/B	4	MB	.9610	1.4S	EX-8810746	0323
1325-01-081-3377	CLUSTER, MK20 MOD 3	2	MB	100	1.1D	EX-8810747	0034
1325-01-081-3378	DISP & BOMB, CBU-MK20 MOD 3 (T-1)	2	MB	.0615	1.4S	EX-8810748	0349
1325-01-085-6022	COMPUTER CONT GP, MAU-169C/B	4	MB	.9610	1.4S	EX-8810749	0323
1325-01-088-4217	CTG, SIGNAL, CXU-3 (B)	50	MB	.0830	1.4G	EX-8810750	0197
1325-01-089-4525	COMPUTER GP, MAU-169A/B	1	MB	.9610	1.4S	EX-8810751	0323
1325-01-090-7482	CONT SEC, DCU-199A/B	1	FB	.9610	1.4C	EX-8810752	0276
1325-01-092-3195	COMPUTER GP, MAU-169B/B	1	MB	.9610	1.4S	EX-8810753	0323
1325-01-098-2812	COMPUTER GP, MAU-169D/B	1	MB	.9610	1.4S	EX-8810754	0323
1325-01-110-6320	COMMON CONT MODULE, WCU-6/B	1	MB	.0003	(M) 2.2S	EX-8808606	1046
1325-01-112-8170	CTG, SIGNAL, CXU-3A/B (B)	50	MB	.0830	1.4G	EX-8711295	0197
1325-01-123-3991	G&C SECTION WGU-12/B	1	MB	.5630	(M) 2.2S	EX-8808607	1046
1325-01-128-7220	FUZE SYS, FMU-124A/B	2	MC	.2712	1.4D	EX-8808608	0410
1325-01-130-6711	FUZE, FMU-112/B	6	MC	.2778	(04)1.2D	EX-8808609	0409
1325-01-137-5955	REGULATOR ASSY VESSEL	N/A	N/A	.0002	(M) 2.2S	EX-8808610	1046
1325-01-137-5992	CONT UNIT ASSY, WCU-8/B	1	MB	.0006	(M) 2.2S	EX-8808611	1046
1325-01-143-1137	BOOSTER, FZU-1/B	10	WB	.0100	1.3C	EX-8810755	0275
1325-01-156-3977	MK339 BOMB FUZE ADAPTER KIT/M129E2 LEAFLET BOMB	N/A	N/A	.0001	1.4B	EX-8808612	0257
1325-01-196-4533	DISP & BOMB, CBU-87/B	2	MB	129.0	(14)1.1D	EX-8806171	0034
1325-01-199-5301	DISP & BOMB, CBU-87(T-1)/B	2	MB	.0816	1.4D		0237
1325-01-214-7311	FUZE, BOMB FMU-139A/B	6	MC	.2778	(04)1.2D	EX-8808613	0409
1325-01-221-5385	BOMB, BLU-109/B	2	PL	535.0	1.1D	EX-8901042	0034
1325-01-222-4196	FUZE, FMU-143/B	1	MC	.2721	1.4D	EX-8812119	0410
1325-01-224-0813	FUZE SYSTEM, FMU-143/B	2	MC	.2721	1.4D	EX-8812120	0410
1325-01-236-8431	G&C SECTION WGU-10/B	1	MB	.0001	(M) 2.2S	EX-8909099	1046
1325-01-237-8904	G&C SECTION WGU-25/B	1	MB	.5630	(M) 2.2S	EX-8808614	1046
1325-01-257-9428	G&C SECTION WGU-12B/B	1	MB	.5630	(M) 2.2S	EX-8808615	1046
1325-01-258-5463	COMPUTER GP, MAU-169F/B	1	MB	.9610	1.4S		0323
1325-01-263-7678	DISP & BOMB, CBU-87A/B	2	MB	129.0	(14)1.1D	EX-8808616	0034
1325-01-263-7679	DISP & BOMB, CBU-87B/B	2	MB	129.0	(14)1.1D	EX-8808617	0034
1325-01-267-7703	CONT UNIT ASSY, WCU-8A/B	1	MB	.0006	(M) 2.2S	EX-8810756	1046
1325-01-269-8006	COMPUTER GP, MAU-169 E/B	1	MB	.9610	1.4S	EX-8810757	0323
1325-01-279-1618	TIMER ACTUATOR, DTU-31/B	8	MB	.0006	1.4S	EX-	0349
1325-01-280-8676	CONTROL UNIT ASSY, WCU-8/B	1	MB	.0006	(M) 2.2S	EX-8810758	1046
1325-01-285-7504	BOMBLET, BLU-97A/B	20	MB	.6386	(04)1.2D	EX-8907069	0035

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1325-01-290-7554	DISP & BOMB, CBU-59/B	1	MB	158.0	(04)1.2D	EX-8808618	0035
1325-01-291-4272	DISP & BOMB, CBU-71A/B	1	MB	148.0	(04)1.2D	EX-8808619	0035
1325-01-291-4273	DISP & BOMB, CBU-58A/B	1	MB	148.0	(04)1.2D	EX-8808620	0035
1325-01-292-5536	DISP & BOMB, CBU-71/B	2	MB	158.0	(04)1.2D	EX-	0035
1325-01-294-5226	DISP & BOMB, CBU-58A/B	1	MB	148.0	(04)1.2D	EX-8808621	0035
1325-01-294-5227	DISP & BOMB, CBU-52B/B	1	MB	146.0	(04)1.2D	EX-8808622	0035
1325-01-294-5228	DISP & BOMB, CBU-58/B	1	MB	158.0	(04)1.2D	EX-8808623	0035
1325-01-294-5229	DISP & BOMB, CBU-71A/B	1	MB	148.0	(04)1.2D	EX-8808624	0035
1325-01-303-9340	G&C SECTION WGU-33/B	1	MB	.0001	(M) 2.2S	EX-	1046
1325-01-304-0002	FUZE SYSTEM, FMU-124B/B	2	MC	.2712	1.4D		0410
1325-01-305-0516	FUZE, FMU-124B/B	1	MC	.2712	1.4D		0410
1325-01-306-7976	COMPUTER GP, MAU-169G/B	1	MB	.9610	1.4S	EX-8810759	0323
1325-01-316-1228	DISP & BOMB, CBU-71/B	1	MB	158.0	(04)1.2D	EX-	0035
1325-01-327-7867	FUZE, FMU-124C/B	1	MC	.2712	1.4D		0410
1325-01-328-1643	DISP & BOMB CBU-87C/B	2	MB	129.0	(14)1.1D	EX-8661754	0034
1325-01-339-5632	DISP & BOMB CBU-87D/B	2	MB	129.0	(14)1.1D	EX-8861754	0034
1325-01-323-9171	FUZE SYSTEM, FMU-143B/B	2	MB	.2721	1.4D	EX-8812119	0410
1325-01-342-9086	G&C SECTION, WGU-25A/B	1	MB	.5630	(M) 2.2S		1046
1325-01-343-1600	DISP & BOMB, CBU-52B/B	2	MB	146.0	(04)1.2D		0035
1325-01-343-1601	DISP & BOMB, CBU-52B/B	2	MB	146.0	(04)1.2D		0035
1325-01-343-1602	DISP & BOMB, CBU-58/B	2	MB	158.0	(04)1.2D		0035
1325-01-343-1603	DISP & BOMB, CBU-58/B	2	MB	158.0	(04)1.2D		0035
1325-01-343-1604	DISP & BOMB, CBU-58A/B	2	MB	148.0	(04)1.2D		0035
1325-01-343-1605	DISP & BOMB, CBU-58A/B	2	MB	148.0	(04)1.2D		0035
1325-01-343-1606	DISP & BOMB, CBU-71/B	2	MB	158.0	(04)1.2D		0035
1325-01-343-1607	DISP & BOMB, CBU-71/B	2	MB	158.0	(04)1.2D		0035
1325-01-343-1608	DISP & BOMB, CBU-71A/B	2	MB	148.0	(04)1.2D		0035
1325-01-343-1609	DISP & BOMB, CBU-71A/B	2	MB	148.0	(04)1.2D		0035
1325-01-349-6258	FUZE, BOMB, FMU-139A/B	6	MC	.2778	(04)1.2D		0409
1325-01-356-1432	G&C SECTION, WGU-39/B	1	MB	.5630	(M) 2.2S		1046
1325-14-398-7137	BLU-107/B DURANDAL W/DD-2	3	MB	80.0	(06)1.2F	EX-8604202	0295
1325-14-407-2791	CUTTER,DD2	3	MB	.0200	1.4B	EX-8812121	0257
1330-00-028-5825	ADAPTER, GRENADE, PROJ, M1A2	48	WB	.0153	*1.4S	EX-8806734	0014
1330-00-028-5830	ADAPTER, GRENADE, PROJ, M2A1	50	WB	.0153	*1.4S	EX-8806735	0014
1330-00-028-5835	GRENADE, HAND, PRAC, M21	25	WB	.0060	1.4G	EX-8806737	0452
1330-00-028-5837	GRENADE, HAND, MK2	25	WB	.1300	(04)1.1F	EX-8806738	0292
1330-00-028-5838	GRENADE, HAND, PRAC, M21	25	WB	.0060	1.4G	EX-8806739	0452
1330-00-028-5839	GRENADE, HAND, M26	30	WB	.3700	(04)1.1F	EX-8806740	0292
1330-00-028-5850	FUZE, GRENADE, PRAC, M10A3	200	WB	.0030	1.4G	EX-8806745	0317
1330-00-028-5851	FUZE, HAND GRENADE, M205	200	WB	.0030	1.4G	EX-8806746	0317
1330-00-028-5854	CHG, PRAC, HAND GRENADE	5000	WB	.0050	1.1D	EX-8806748	0028

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6		DOT CONT NO. 7	UN SER NO. & MKG 8
1330-00-028-5855	CHG, PRAC, HAND GRENADE		4000	WB	.0050		1.1D	EX-8806749	0028
1330-00-028-5856	CHG, PRAC, HAND GRENADE		750	WB	.0050		1.1D	EX-8806750	0028
1330-00-028-5857	CHG, PRAC, HAND GRENADE		500	WB	.0050		1.1D	EX-8806751	0028
1330-00-028-5858	CHG, PRAC, HAND GRENADE		1250	WB	.0050		1.1D	EX-8806752	0028
1330-00-028-5860	GRENADE, RIFLE, WP, M19A1	(C)	10	WB	.5300		(04)1.2H	EX-8806753	0245
1330-00-028-5906	GRENADE, RIFLE, ILL, M27	(E)	10	WB	.5300		1.3G	EX-8806763	0254
1330-00-028-5908	GRENADE, RIFLE, SMK, RED, M22A2	(E)	10	WB	.4000		1.4G	EX-8806764	0303
1330-00-028-5915	GRENADE, RIFLE, SMK, RED STREAMER, M23A1	(E)	10	WB	.4400		1.4G	EX-8806768	0303
1330-00-028-5916	GRENADE, RIFLE	(E)	10	WB	.4400		1.4G	EX-8806769	0303
1330-00-133-8244	GRENADE, M67		30	WB	.4100		(04)1.1F	EX-8806772	0292
1330-00-133-9275	GRENADE, PRAC, M69		50	WB	.0030		1.4S	EX-8806773	0110
1330-00-168-5502	FUZE, GRENADE, XM228		10	WB	.0030		1.4B	EX-8912141	0257
1330-00-219-8510	GRENADE, HAND SMK, M15, WP	(C)	16	WB	.94		(04)1.2H	EX-8806778	0245
1330-00-219-8511	GRENADE, HAND SMK, AN-M8, HC	(DE)	16	WB	1.2		1.4G	EX-8806779	0303
1330-00-219-8557	GRENADE, AN-M14	(DE)	16	WB	1.7		1.3G	EX-8807252	0010
1330-00-219-8576	GRENADE, HAND, M7, CN	(B)	16	WB	.6400	(G)	1.4G	EX-8806780	0301
1330-00-219-8577	GRENADE, HAND, AN-M7A1, CN	(B)	16	WB	.7800	(G)	1.4G	EX-8806781	0301
1330-00-219-8578	GRENADE, HAND, M25A1, CN-1	(B)	50	WB	.2000	(G)	1.4G	EX-8806782	0301
1330-00-289-6851	GRENADE, HAND, M18	(E)	16	WB	.7200		1.4G	EX-8806784	0303
1330-00-289-6852	GRENADE, HAND, M18	(E)	16	WB	.7200		1.4G	EX-8812230	0303
1330-00-289-6853	GRENADE, HAND, M18	(E)	16	WB	.7200		1.4G	EX-8812231	0303
1330-00-289-6854	GRENADE, HAND, M18	(E)	16	WB	.7200		1.4G	EX-8806785	0303
1330-00-541-9848	GRENADE, RIFLE, HEAT, M31		10	WB	.6200		1.1D	EX-8806791	0284
1330-00-585-9362	CHG, PRAC, HAND GRENADE		6000	WB	.0050		1.1D	EX-8806792	0028
1330-00-645-6211	GRENADE, HAND, M25A2, CS-1	(B)	50	WB	.1300	(G)	1.4G	EX-8806794	0301
1330-00-676-2671	GRENADE, HAND-RIFLE, M34, WP	(C)	16	WB	.9400		(04)1.2H	EX-8806795	0245
1330-00-682-4645	GRENADE, HAND, CN-1, ABC-M25A1	(B)	50	WB	.2000	(G)	1.4G	EX-8806796	0301
1330-00-682-4646	GRENADE, HAND, DM-1, ABC-M25A2	(B)	50	WB	.1400	(G)	1.4G	EX-8806797	0301
1330-00-764-8435	CTG, GRENADE, XM195		1080	WC	.0030		*1.4S	EX-8806799	0014
1330-00-799-8816	GRENADE, HAND CS, M7A2	(B)	16	WB	.5600	(G)	1.4G	EX-8806801	0301
1330-00-926-1857	GRENADE, HAND, M26A1		30	WB	.3900		(04)1.1F	EX-8806803	0292
1330-00-926-4011	CTG, GRENADE, XM195		1080	WC	.0030		*1.4S	EX-8806804	0014
1330-00-935-2030	CTG, GRENADE, M195		2280	WC	.0030		*1.4S	EX-8806805	0014
1330-00-935-6064	GRENADE, HAND, M61		30	WB	.3400		(04)1.1F	EX-8806806	0292
1330-00-935-6092	GRENADE, HAND, MK1 MOD2	(E)	24	WB	.2200		1.3G	EX-8806807	0254
1330-00-965-0802	GRENADE, HAND, M7A3, CS	(B)	16	WB	.7500	(G)	1.4G	EX-8806808	0301
1330-00-969-6824	GRENADE, HAND, ILL, MK1 MOD 1	(E)	25	WB	.2200		1.3G	EX-8806809	0254
1336-00-001-1649	WARHEAD, MK5 MOD 1		1	MB	54.0		1.1D	EX-8806810	0286
1336-00-001-1650	WARHEAD, MK86 MOD 1		1	MB	50.0		1.1D	EX-8806811	0286
1336-00-008-5328	FUZE, MK330 MOD 2		*	*	.3647		1.1D	EX-8806812	0408

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1336-00-014-0509	WARHEAD, MK38 MOD 0	1	MB	20.0	1.1D	EX-8806813	0286
1336-00-022-9378	SWITCH, SQUIB ACT	1	MB	.0002	1.4S	EX-8810761	0349
1336-00-043-5277	FUZE, GUIDED MSL, MK312 MOD 0	8	WB	.3700	1.1B	EX-8810762	0106
1336-00-043-5278	FUZE, GUIDED MSL, MK312 MOD 2	8	WB	.3700	1.1D	EX-8810763	0408
1336-00-051-3571	EXPL CHG, M1	1	MB	.0018	1.1D	EX-8810764	0290
1336-00-051-7573	GEN ASSY	1	FB	.0043	1.4C	EX-8810765	0276
1336-00-054-5341	TANK AND PRIMER ASSY	1	MB	.0001	1.4S	EX-8810767	0323
1336-00-062-5085	S&A DEVICE, W/O BOOSTER, MK35 MOD 0	1	FB	.0017	1.4S	EX-8810768	0367
1336-00-067-0138	EXPL CHG, M1	1	MB	.0009	1.4B	EX-8810769	0383
1336-00-067-0139	EXPL CHG, M1	1	FB	.0054	1.4B	EX-8810770	0383
1336-00-070-2472	GEN, GAS PRESSURE	1	FB	.0037	1.4C	EX-8810771	0276
1336-00-070-2484	VALVE	*	*	.0006	1.4S	EX-8810772	0349
1336-00-071-4138	INITIATOR, ELECTRIC	1	MC	.0070	1.4S	EX-8810773	0454
1336-00-076-1005	EXPL CHG, M1	1	MB	.0023	1.1D	EX-8810774	0290
1336-00-076-3185	S&A MECH	1	FB	.0166	1.4B	EX-8810775	0257
1336-00-076-3186	BOOSTER, DELAY, SKIRT	1	FB	.0166	1.4G	EX-8810776	0325
1336-00-076-3188	BOOSTER, DELAY, SKIRT	1	FB	.0068	1.4G	EX-8810777	0325

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1336-00-076-3189	S&A MECH	1	MB	.0003	1.4B	EX-8810778	0257
1336-00-076-4687	EXPL CHG, M1	1	MB	.0026	1.1D	EX-8810779	0290
1336-00-076-4688	DETONATOR ASSY	1	FB	.0010	1.1B	EX-8810780	0030
1336-00-076-4715	EXPL CHG, M1	1	MB	.0030	1.1D	EX-8810781	0290
1336-00-076-6180	BOOSTER, SKIRT REMOVAL	1	FB	.0014	1.4B	EX-8810782	0257
1336-00-077-0062	S&A DEVICE	1	MB	.0004	1.4B	EX-8810783	0257
1336-00-077-0065	S&A DEVICE	1	MB	.0023	1.4B	EX-8810784	0257
1336-00-078-6349	VALVE	1	MB	.0005	1.4S	EX-8810786	0349
1336-00-079-3978	TANK & PRIMER ASSY	1	FB	.0002	1.4S	EX-8810787	0323
1336-00-092-8473	WARHEAD, MK85 MOD 1	1	MB	.3647	(04)1.2B	EX-8810788	0107
1336-00-104-0184	WARHEAD	1	MB	180.0	(12)1.2D	EX-8810790	0287
1336-00-106-6808	GEN, GAS PRESSURE	1	MC	4.6	1.3C	EX-8810791	0186
1336-00-106-6809	GEN, GAS PRESSURE	1	MC	2.5	1.3C	EX-8810792	0186
1336-00-126-6002	FUZE & TIMER ASSY	1	MB	.0008	1.4G	EX-8810793	0317
1336-00-126-6003	CABLE ASSY	1	MB	.0008	1.4S	EX-8810794	0454
1336-00-127-4043	CABLE ASSY	1	MB	.0006	1.4S	EX-8810795	0454
1336-00-130-9251	WARHEAD	1	MB	370.7	1.1D	EX-8810796	0286
1336-00-133-5015	DET ASSY	1	FB	.0010	1.1B	EX-8810797	0030
1336-00-135-2872	WARHEAD, MK5 MOD 0	1	MB	54.0	1.1D	EX-8806816	0286
1336-00-136-6435	FUZE, DELAY	*	MB	.0125	1.4G	EX-8810798	0103
1336-00-152-3304	FUZE, GUIDED MSL, MK303 MOD 2	1	MB	.0771	1.1D	EX-8806817	0408
1336-00-160-2797	FUZE, CM	1	MB	.2482	1.4G	EX-8810799	0103
1336-00-163-3121	SQUIB, ELEC	1	FB	.0001	1.4S	EX-8810800	0454
1336-00-236-4782	SQUIB, ELEC	100	FB	.0002	1.4S	EX-8810804	0454
1336-00-239-2262	EXPL CHG	1	FB	.0006	1.4B	EX-8810805	0257
1336-00-239-2264	S&A MECH	1	MB	.0003	1.4B	EX-8810806	0257
1336-00-262-4156	EXPL BOLT ASSY	1	MB	.0010	1.4S	EX-8810807	0173
1336-00-299-1491	CYL, SQUIB, ACT	1	FB	.0003	(M) 2.2S	EX-8810810	1046
1336-00-341-5810	WARHEAD, MK2 MOD 2	1	MB	2.6	1.1D	EX-8810811	0286
1336-00-344-4485	WARHEAD	1	MB	179.0	(12)1.2D	EX-8810812	0287
1336-00-350-9419	WARHEAD, MK48 MOD 5	2	MB	10.5	1.1D	EX-8811512	0168
1336-00-397-4220	GEN GAS, MK6	12	MB	.0360	1.4C	EX-8803540	0276
1336-00-400-1038	FUZE, INFLUENCE	1	MB	.0772	1.4S	EX-8810813	0349
1336-00-400-4147	TIMER ASSY	1	MB	.0001	1.4S	EX-8810814	0349
1336-00-403-0499	SQUIB, ELEC	1	FB	.0068	1.4S	EX-8810815	0323
1336-00-406-2765	FUZE, GUIDED MSL	1	MB	.1323	(04)1.2D	EX-8810816	0409
1336-00-406-9960	EXPL TRANSFER ASSY	1	MB	.1300	(04)1.2B	EX-8810817	0107
1336-00-406-9961	CMD DEST, S&A	1	FB	.0009	1.4S	EX-8810818	0367
1336-00-406-9963	LINEAR SHAPED CHG	1	WB	.8300	1.1D	EX-8810819	0043
1336-00-406-9964	LINEAR SHAPED CHG	1	WB	.8300	1.1D	EX-8810820	0043
1336-00-407-9617	INITIATOR	1	FB	.0002	1.4S	EX-8810821	0454

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1336-00-407-9618	DET, S&A	1	FB	.0001	1.4B	EX-8810822	0365
1336-00-410-9407	FUZE, MK330 MOD 2	1	FB	.0010	(04)1.2D	EX-8806819	0409
1336-00-420-2980	GEN, GAS PRESSURE	1	MB	.2100	1.3C	EX-8810823	0275
1336-00-420-2981	INITIATOR	1	MB	.0004	1.4G	EX-8810824	0325
1336-00-420-2985	S&A DEVICE	1	MB	.0001	1.4B	EX-8810825	0257
1336-00-422-1853	CTG, IMPULSE	1	MB	.0024	1.4C	EX-8810826	0276
1336-00-427-9095	SQUIB, ELEC	1	FB	.0001	1.4S	EX-8810827	0454
1336-00-429-2500	IGNITER, GAS GEN	1	FB	.0100	1.4G	EX-8810828	0325
1336-00-432-2682	ARMING DEVICE	1	FB	.2235	1.1B	EX-8810829	0106
1336-00-432-2699	ACTUATOR, EXPL, LINEAR	1	FB	.0001	1.4S	EX-8810830	0349
1336-00-438-9692	DISP, CM	1	MB	.0033	1.4C	EX-8810831	0276
1336-00-445-9456	IGNITER, GAS GEN	1	FB	.1808	(04)1.2G	EX-8810832	0314
1336-00-455-7854	CTG, IMPULSE	1	MB	.0003	1.4C	EX-8810835	0276
1336-00-455-7855	CTG, IMPULSE	1	MB	.0003	1.4C	EX-8810836	0276
1336-00-458-3557	S&A DEVICE	1	MB	.0003	1.4S	EX-8810837	0367
1336-00-458-5228	ORDNANCE MODULE	1	MB	.0008	1.4S	EX-8912134	0323
1336-00-479-0408	ORDNANCE MANIFOLD	1	MB	.0032	1.4B	EX-8810838	0350
1336-00-484-2544	CORD ASSY, DET	1	FB	.0004	1.4D	EX-8810839	0289
1336-00-497-3633	VALVE	1	MB	.0002	1.4S	EX-8810840	0349
1336-00-516-5587	WARHEAD, MK8 MOD 1	2	MB	10.5	1.1D	EX-8806820	0286
1336-00-516-5588	BOOSTER, WARHEAD	*	WB	.0987	1.1D	EX-8806821	0042
1336-00-554-4666	PRIMER, ELECTRIC	*	WB	.0001	1.4S	EX-8810843	0454
1336-00-558-1859	FUZE & TIMER ASSY	1	MB	.2482	1.4G	EX-8810844	0103
1336-00-572-3072	TRIGGER	1	FB	.0003	1.4S	EX-8810846	0349
1336-00-611-4389	FUZE, GUIDED MSL, MK303 MOD 2	1	MB	.0771	1.1D	EX-8806822	0408
1336-00-611-4439	BOOSTER, MK34 MOD 1	*	WB	.077	1.1D	EX-8803558	0042
1336-00-622-2407	CTG, IMPULSE	1	FB	.0017	1.4C	EX-8810847	0276
1336-00-658-3260	FUZE, GUIDED MSL, MK304 MOD 1	4	MB	.0771	1.1D	EX-8806823	0408
1336-00-658-9705	WARHEAD, PRAC, MK2 MOD 0 (E)	2	MB	9.8	1.1G	EX-8806824	0094
1336-00-691-2231	FUZE, GUIDED MSL, MK304 MOD 2	4	MB	.0771	1.1D	EX-8806826	0408
1336-00-706-9518	WARHEAD, MK8 MOD 2	2	MB	10.5	1.1D	EX-8806827	0286
1336-00-709-8321	IGNITER, GAS GEN	*	WB	.0012	1.4G	EX-8810850	0325
1336-00-731-0453	PRIMER ASSY	1	MB	.0001	1.4S	EX-8810852	0454
1336-00-738-6228	GEN, GAS PRESSURE	1	MB	2.5	1.3C	EX-8810854	0186
1336-00-756-4770	PRIMER, NONELECTRIC	1	MB	.0008	1.1B	EX-8810855	0029
1336-00-763-4991	EXPL CHG	1	MB	.0010	1.4B	EX-8810856	0257
1336-00-764-4797	SQUIB, ELEC	1	MB	.0012	1.4S	EX-8810857	0454
1336-00-764-6305	SQUIB, ELEC	1	FB	.0001	1.4S	EX-8810858	0454
1336-00-764-6306	SQUIB, ELEC	1	FB	.0001	1.4S	EX-8810859	0454
1336-00-770-6367	WARHEAD, MK19 MOD 0	1	MB	103.5	1.1D	EX-8806830	0286
1336-00-770-6382	BOOSTER, WARHEAD, MK44	1	FB	.3638	1.1D	EX-8806831	0042

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1336-00-770-6388	FUZE, GUIDED MSL, MK312 MOD 0	8	WB	.3700	1.1D	EX-8806832	0408
1336-00-770-6401	WARHEAD	1	MB	103.5	1.1D	EX-8810861	0286
1336-00-776-6731	PISTOL, LOADED	1	MB	.0001	1.4S	EX-8810862	0367
1336-00-777-3312	ACTUATION SYS, HYDRAULIC	1	WB	.0003	(M) 2.2S	EX-8810863	1046
1336-00-783-7553	PRIMER ASSY	1	MB	.0001	1.4S	EX-8810864	0454
1336-00-786-5928	FUZE, GUIDED MSL	1	MB	.0010	1.4S	EX-8810865	0349
1336-00-797-8845	FUZE, GUIDED MSL	20	FB	.3647	1.1D	EX-8806834	0408
1336-00-801-7506	BOOSTER, FUZE MK38 MOD 1	1	WB	.1160	1.1D	EX-8803600	0042
1336-00-801-7549	S&A DEVICE, MK5 MOD 2	1	FB	.1200	1.1D	EX-8810866	0408
1336-00-827-8481	CTG, IMPULSE	1	MB	.0970	1.4C	EX-8810867	0276
1336-00-829-1608	S&A DEVICE	*	*	.0003	1.4S	EX-8810868	0367
1336-00-831-7897	SWITCH, SQUIB ACT	1	MB	.0001	1.4S	EX-8810869	0349
1336-00-854-0885	LINEAR SHAPED CHG	1	WC	.2000	1.1D	EX-8810870	0043
1336-00-858-4298	WARHEAD	1	MB	371.0	1.1D	EX-8806837	0286
1336-00-858-4302	FUZE, GUIDED MSL, MK312 MOD 2	8	WB	.3700	1.1D	EX-8806838	0408
1336-00-858-4315	WARHEAD, MK45 MOD 0	2	MB	10.5	1.1D	EX-8803609	0286
1336-00-863-4458	TANK & PRIMER ASSY	1	MB	.0001	1.4S	EX-8810871	0323
1336-00-877-5748	SQUIB, ELEC	1	MB	.0004	1.4S	EX-8810873	0454
1336-00-879-4428	WARHEAD, MK38 MOD 0	1	MB	20.2	1.1D	EX-8806839	0286
1336-00-883-5358	S&A DEVICE	1	FB	.0035	1.4S	EX-8810875	0367
1336-00-883-5360	BOOSTER, WARHEAD	1	FB	.2200	1.1D	EX-8810876	0042
1336-00-883-5361	WARHEAD	1	MB	85.0	1.1D	EX-8810877	0286
1336-00-885-0524	FUZE, GUIDED MSL, MK303 MOD 2	1	MB	.0771	1.1D	EX-8810878	0408
1336-00-885-0527	CANISTER, COUNT	1	MB	.1000	(04)1.2B	EX-8810879	0107
1336-00-885-0528	CANISTER, COUNT	1	MB	.1000	(04)1.2B	EX-8810880	0107
1336-00-890-9866	SQUIB ELEC	1	FB	.0003	1.4S	EX-8810881	0454
1336-00-897-0720	WARHEAD, MK3	1	MB	4.9	1.1D	EX-8810882	0286
1336-00-898-6080	GAS GEN	*	MB	.5511	1.4C	EX-8810883	0276
1336-00-900-0054	CTG, IMPULSE	*	FB	.0005	1.4C	EX-8810884	0276
1336-00-901-3210	PRIMER, ELECTRIC	*	FB	.0001	1.4S	EX-8810885	0454
1336-00-901-6445	CTG, IMPULSE	1	MB	.0005	1.4C	EX-8810886	0276
1336-00-902-2282	PRIMER, ELECTRIC	*	FB	.0001	1.4S	EX-8810887	0454
1336-00-903-0256	WARHEAD, MK19 MOD 0	1	MB	103.6	1.1D	EX-8806844	0286
1336-00-906-9884	FUZE, GUIDED MSL, MK303 MOD 3	1	MB	.0771	1.1D	EX-8810888	0408
1336-00-911-1500	WARHEAD, MK8 MOD 3	2	MB	10.5	1.1D	EX-8806845	0286
1336-00-912-4430	GEN ASSY	*	*	.0043	1.4C	EX-8810889	0276
1336-00-915-0823	EXPL CHG	1	MB	.0008	1.4B	EX-8810890	0383
1336-00-915-0824	EXPL CHG	1	MB	.0010	1.4B	EX-8810891	0383
1336-00-915-0826	BOOSTER ASSY	1	MB	.0158	(04)1.2G	EX-8810892	0314
1336-00-916-9921	S&A MECH	1	MB	.0003	1.4B	EX-8810893	0257
1336-00-916-9922	S&A MECH	1	MB	.0003	1.4B	EX-8810894	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1336-00-917-3109	DESTRUCT SYS	1	MB	.0018	1.1D	EX-8810895	0043
1336-00-918-2556	SQUIB, ELEC	1	MB	.0002	1.4S	EX-8810896	0454
1336-00-923-6292	SWITCH, SQUIB ACT	1	MB	.0001	1.4S	EX-8810897	0349
1336-00-930-3478	WARHEAD, MK68 MOD 0	1	MB	50.0	1.1D	EX-8806846	0286
1336-00-931-3590	EXPL CHG	1	MB	.0030	1.1D	EX-8810898	0290
1336-00-932-2434	EXPL CHG	1	MB	.0024	1.1D	EX-8810899	0290
1336-00-936-3421	DESTRUCT CHG	1	MB	.3100	1.1D	EX-8810900	0290
1336-00-946-7418	TANK & PRIMER ASSY	1	MB	.0001	1.4S	EX-8810902	0349
1336-00-948-1770	SQUIB, ELEC	1	MB	.0012	1.4S	EX-8810903	0454
1336-00-955-6310	FUZE, GUIDED MSL, FMU-31/B	1	MB	.1433	(04)1.2D	EX-8810904	0409
1336-00-961-7081	DESTRUCT SYS	1	MB	.8210	1.1D	EX-8810905	0043
1336-00-975-8230	EXPL CHG ASSY	1	MB	.0003	1.4B	EX-8810907	0257
1336-00-976-0427	TRIGGER	1	FB	.0003	1.4S	EX-8810908	0349
1336-00-988-4486	SAFETY SWITCH	1	FB	.0003	1.4S	EX-8810909	0349
1336-00-991-9760	GEN, GAS PRESSURE	1	MB	.0043	1.4S	EX-8810910	0323
1336-00-999-2224	SQUIB, ELEC	1	MB	.0002	1.4S	EX-8810911	0454
1336-01-005-3959	S&A DEVICE, W/O BOOSTER, MK33 MOD 0	1	WB	.0017	1.4S	EX-8806849	0367
1336-01-006-0522	WARHEAD, MK71 MOD 0	1	MB	26.1	1.1D	EX-8806850	0286
1336-01-017-4030	S&A DEVICE, MK13 MOD 2	20	MB	.0039	1.4S	EX-8806851	0367
1336-01-020-4946	WARHEAD, MK8 MOD 4	2	MC	10.5	1.1D	EX-8806852	0286
1336-01-027-0089	FUZE, INFLUENCE, MK303 MOD 4	4	MB	.0771	1.1D	EX-8810912	0408
1336-01-029-7387	SQUIB, GAS GEN	1	FB	.0198	1.4S	EX-8810913	0454
1336-01-033-8319	WARHEAD, WDU-22/B	1	MC	42.0	1.1D	EX-8806853	0286
1336-01-034-3393	WARHEAD, WAU-8/B	1	MC	42.0	1.1D	EX-8806854	0286
1336-01-034-3394	WARHEAD, WAU-9/B	1	MB	52.0	1.1D	EX-8806855	0286
1336-01-038-6205	S&A DEVICE, MK35 MOD 0, W/BOOSTER	4	MB	.1089	1.1D	EX-8810914	0408
1336-01-044-7430	WARHEAD, WDU-17/B	2	MB	7.4	1.1D	EX-8806856	0286
1336-01-045-5731	SQUIB, ELEC	N/A	N/A	.0001	1.4S	EX-8810915	0454
1336-01-047-7132	DSU-21/B	4	MC	.0771	1.1D	EX-8810916	0408
1336-01-057-3706	WARHEAD, WAU-10/B	1	MB	26.1	1.1D	EX-8711478	0286
1336-01-060-6502	SWITCH ASSY	*	FB	.0001	1.4S	EX-8810917	0349
1336-01-076-7806	FUZE, COUNTERMEASURE, 300 SEC	N/A	N/A	.0180	1.4G	EX-8810918	0103
1336-01-079-9712	WARHEAD, MK54	2	MB	10.5	1.1D	EX-8810919	0286
1336-01-080-3046	TGT DET, DSU-21/B-1	4	MC	.0771	1.1D	EX-8810920	0408
1336-01-080-3047	TGT DET, DSU-21/B-2	4	MC	.0771	1.1D	EX-8810921	0408
1336-01-080-3048	TGT DET, DSU-21/B-3	4	MC	.0771	1.1D	EX-8810922	0408
1336-01-080-3049	TGT DET, DSU-21/B-4	4	MC	.0771	1.1D	EX-8810923	0408
1336-01-088-2231	S&A DEVICE, W/BOOSTER, MK33 MOD 0	1	WB	.1089	1.1B	EX-	0106
1336-01-093-4583	GAS GEN, MK1 MOD 0	*	MB	.5291	1.4C	EX-8810924	0276
1336-01-117-7614	SQUIB SWITCH	N/A	N/A	N/A	1.4S	EX-	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1336-01-118-4636	CTG, WING ACTUATOR	*	FB	.0300	1.4C	EX-8205067	0276
1336-01-118-4637	CTG, FIN ACTUATOR	*	FB	.0300	1.4C	EX-8808625	0276
1336-01-122-6914	GAS GEN UNIT	1	WB	.0007	(M) 2.2S	EX-8808626	1066
1336-01-124-9369	RELEASE ASSEMBLY	*	WB	.0016	1.4S	EX-8602021	0367
1336-01-125-9400	CTG, ELEVON ACTUATOR	*	FB	.0290	1.4C	EX-8205068	0276
1336-01-128-7253	TANK ASSY, TMU-73/A	*	FB	.0003	(M) 2.2S	EX-8808627	1072
1336-01-128-8416	TGT, DET, DSU-21/B	4	MC	.0771	1.1D	EX-8810926	0408
1336-01-129-2305	WARHEAD, WAU-17/B	1	MB	36.0	1.1D	EX-8808628	0286
1336-01-129-5283	CTG, ENGINE STARTER, CJU-2/B	*	FB	.6550	1.3C	EX-8205071	0275
1336-01-146-0729	INITIATOR, ELEC	*	WB	.0007	1.4S	EX-8810927	0454
1336-01-159-3033	FUZE, FMU-111/B	1	MB	.0026	1.4D	EX-8711507	0410
1336-01-159-3039	BOOSTER, MK-44	1	MB	.2470	1.1D	EX-8711509	0042
1336-01-160-6451	S&A DEVICE	24	MB	.0028	1.4S	EX-	0349
1336-01-160-9175	HYD ACT SYS	1	WB	.0003	(M) 2.2S	EX-8808629	1046
1336-01-162-3422	WARHEAD, WAU-7/B	1	MB	45.2	1.1D	EX-8711510	0286
1336-01-165-5942	CTG, PRESSURE	*	FB	.0004	1.4S	EX-8808630	0454
1336-01-171-6948	WARHEAD, WAU-17A/B	1	MB	36.0	1.1D	EX-8711511	0286
1336-01-178-5834	INITIATOR	*	FB	.0005	1.4S	EX-8707194	0454
1336-01-179-1705	CENTER AFT SECTION, AGM-65D	1	*	85.0	1.1E	EX-8504142	0181
1336-01-180-2092	DOME COVER ACTUATOR	1	FB	.0001	1.4S	EX-	0349
1336-01-189-1245	RETAINER CHARGE RING	1	WB	.0400	1.4S	EX-9102051	0441
1336-01-196-3743	GAS GENERATOR	*	FB	.0012	1.4C	EX-8801140	0276
1336-01-201-1726	GAS GENERATOR	1	WB	7.1	1.4C	EX-8808631	0276
1336-01-201-3963	IGNITER, MX STAGE III	1	WB	5.6	1.1C	EX-8708027	0271
1336-01-202-9196	INITIATOR, OXYGEN TANK	*	FB	.0004	1.4S	EX-	0454
1336-01-202-9717	GAS GENERATOR	1	WB	1.6	1.4C	EX-8808632	0276
1336-01-230-5975	INITIATOR	*	FB	.0005	1.4S	EX-8707195	0454
1336-01-236-9443	HYD ACT SYS	1	WB	.0003	(M) 2.2S	EX-8810928	1046
1336-01-247-6235	SPIN GENERATOR	1	WB	*	1.3C	EX-8909060	0186
1336-01-268-2093	GENERATOR, HOT GAS	1	MB	324.7	1.3C	EX-9204064	0186
1336-01-269-1166	TGT DET, DSU-21/B	4	MC	.0771	1.1D	EX-8810929	0408
1336-01-286-9502	TANK ASSY, OXYGEN	*	FB	.0009	(N) 2.2S	EX-8808633	1072
1336-01-289-3701	PNEUMATIC ACTUATION SYSTEM	1	WB	.0003	(M) 2.2S		1046
1337-00-010-5083	RKT MTR	1	MB	.0362	1.1C	EX-8810930	0280
1337-00-030-9019	IGNITER ASSY, MK274 MOD 1A	1	MB	.0727	(04)1.2G	EX-8806857	0314
1337-00-032-2462	RKT MTR, M5 NIKE	1	WC	755	1.3C	EX-8806858	0186
1337-00-050-8795	RKT MTR	1	MB	45,800	1.3C	EX-8810931	0186
1337-00-051-7570	SPIN MTR ASSY	1	MB	.0167	1.3C	EX-8810932	0186
1337-00-051-7572	DOOR ASSY, TUMBLE	1	MB	.0084	1.3C	EX-8810933	0186
1337-00-055-6930	PYROGEN ASSY	1	MB	2.0	1.3C	EX-8810934	0186

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1337-00-055-8765	RKT MTR	1	MB	10,378	1.3C	EX-8810935	0186
1337-00-062-0078	IGNITER & S&A ASSY	1	MB	3.2	1.1C	EX-8810936	0280
1337-00-071-3787	RKT MTR, MK17	1	MB	43.2	1.3C	EX-8806859	0186
1337-00-072-5198	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8810944	0280
1337-00-078-4250	RKT MTR, M55A1	1	MB	45,800	1.3C	EX-8810945	0186
1337-00-086-6956	IGNITER RKT MTR, MXU-239/A	1	MC	1.3	1.1C	EX-8810946	0280
1337-00-105-6649	RKT MTR, MK27 MOD 4	1	WB	560.0	1.3C	EX-8806861	0186
1337-00-113-0055	IGNITER MK274 MOD 0	1	MB	.0599	(04)1.2G	EX-8806862	0314
1337-00-113-0062	INITIATOR	1	FB	.0001	1.4S	EX-8810947	0454
1337-00-126-6012	RKT, CM	1	MB	.4174	(04)1.2C	EX-8810955	0281
1337-00-126-9699	RKT MTR, MK38 MOD 4	1	MB	91.6	1.3C	EX-8806863	0186
1337-00-127-4051	RKT MTR	1	MB	3.3	1.3C	EX-8810956	0186
1337-00-127-4052	RKT MTR	1	MB	3.0	1.3C	EX-8810957	0186
1337-00-127-4053	RKT MTR	1	MB	2.7	1.3C	EX-8810958	0186
1337-00-127-4055	RKT MTR	1	MB	2.0	1.3C	EX-8810959	0186
1337-00-127-8346	RKT MTR	1	MB	1.7	1.3C	EX-8810960	0186
1337-00-132-1931	RKT MTR	1	MB	3.7	1.1C	EX-8810961	0280
1337-00-163-6121	SYS SPIN FAIRING	N/A	N/A	.0167	1.3C	EX-8810963	0186
1337-00-163-6122	DOOR INSTAL FAIRING	N/A	N/A	.0084	1.3C	EX-8810964	0186
1337-00-179-9203	RKT MTR, MK52 MOD 2	1	MB	90.0	1.3C	EX-8806864	0186
1337-00-183-0945	RKT MTR, MK39 MOD 7	1	MB	92.0	1.3C	EX-8806865	0186
1337-00-186-8540	RKT MTR, MK78 MOD 0	1	MB	106	1.3C	EX-8806866	0186
1337-00-193-3205	RKT MTR	1	MB	2.0	(04)1.2C	EX-8810967	0281
1337-00-202-3812	RKT MTR	1	WB	1000	1.3C	EX-8810968	0186
1337-00-226-5378	RKT MTR	1	MB	3.5	1.1C	EX-8810969	0280
1337-00-228-4724	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8810970	0280
1337-00-232-4187	RKT MTR, SR109	1	WB	64.7	1.3C	EX-8810971	0186
1337-00-236-4866	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8810972	0280
1337-00-239-9676	FUZE, RETENTION DEVICE	1	MB	.0025	1.4G	EX-8810973	0103
1337-00-251-1006	RKT MTR	1	WB	13680	1.3C	EX-8810974	0186
1337-00-260-0276	ORDNANCE SUBSYSTEM	1	FB	.0007	1.4B	EX-8810975	0383
1337-00-269-5030	IGNITER, RKT MTR	1	FB	.1760	(04)1.2G	EX-8810976	0314
1337-00-344-4472	IGNITER, RKT MTR	50	WB	.1100	(04)1.2G	EX-8810977	0314
1337-00-411-7050	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8810978	0280
1337-00-411-7051	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8810979	0280
1337-00-412-0167	IGNITER, GAS GEN	1	MB	.0220	(04)1.2G	EX-8810980	0314
1337-00-455-3751	IGNITER, RKT MTR	1	MB	7.2	1.3C	EX-8810982	0186
1337-00-455-7853	RKT MTR	1	MB	6.9	1.3C	EX-8810983	0186
1337-00-456-3487	INITIATOR	1	MB	.0055	1.4G	EX-8810984	0325
1337-00-463-1708	RKT MTR	1	WB	64.7	1.3C	EX-	0186
1337-00-465-9582	IGNITER, MK274 MOD 1	1	MB	.0599	(04)1.2G	EX-8806867	0314

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1337-00-469-7088	RKT MTR	1	MB	13680	1.3C	EX-8810985	0186
1337-00-469-7089	RKT MTR	1	MB	13680	1.3C	EX-8810986	0186
1337-00-470-3953	RKT MTR	1	WB	1000	1.3C	EX-8810987	0186
1337-00-470-3980	IGNITER & S & A DEVICE	1	MB	1.6	1.3C	EX-8810988	0186
1337-00-482-4651	ORDNANCE SUBSYSTEM	1	MB	.0025	1.4B	EX-8810989	0257
1337-00-493-4982	RKT MTR	1	MB	1.6	1.3C	EX-8810990	0186
1337-00-493-4983	RKT MTR	1	MB	1.4	1.3C	EX-8810991	0186
1337-00-493-4984	RKT MTR	1	MB	.9972	1.3C	EX-8810992	0186
1337-00-493-4985	RKT MTR	1	MB	3.3	(04)1.2C	EX-8810993	0281
1337-00-493-4986	RKT MTR	1	MB	3.0	(04)1.2C	EX-8810994	0281
1337-00-493-4987	RKT MTR	1	MB	2.7	(04)1.2C	EX-8810995	0281
1337-00-493-4988	RKT MTR	1	MB	2.3	(04)1.2C	EX-8810996	0281
1337-00-493-4989	RKT MTR	1	MB	1.6	(04)1.2C	EX-8810997	0281
1337-00-493-4990	RKT MTR	1	MB	1.4	(04)1.2C	EX-8810998	0281
1337-00-493-4991	RKT MTR	1	MB	.9972	(04)1.2C	EX-8810999	0281
1337-00-493-4992	RKT MTR	1	MB	.180	(04)1.2C	EX-8809145	0281
1337-00-494-8805	IGNITER, GEN	1	MB	.0044	1.4G	EX-8809146	0325
1337-00-494-8806	IGNITER	1	MB	1.5	1.3G	EX-8809147	0315
1337-00-504-3342	PYROGEN UNIT	1	MB	4.2	1.3C	EX-8809148	0186
1337-00-520-3507	RKT MTR	1	MB	7281	1.3C	EX-8809149	0186
1337-00-520-3509	S & A DEVICE	1	MB	.0076	1.4B	EX-8809150	0257
1337-00-520-3512	CORD ASSY, DET	1	MB	.0013	1.4D	EX-8809151	0410
1337-00-520-3513	MANIFOLD ASSY	1	MB	.0006	1.4B	EX-8809152	0257
1337-00-520-3539	CUTTER, THRUST, TERM	1	MB	.0490	(04)1.2B	EX-8809153	0107
1337-00-520-3540	GAS GEN	1	MB	4.7	1.3C	EX-8809154	0186
1337-00-546-2231	RKT MTR, M5E1, W/IGN	1	MB	750.2	1.3C	EX-8811546	0186
1337-00-550-7268	RKT MTR	4	MB	61.6	1.3C	EX-8806868	0186
1337-00-585-9774	RKT MTR, M58A2	1	MB	31.2	1.3C	EX-8809156	0186
1337-00-603-9450	RKT MTR	1	MB	1365	1.3C	EX-8809157	0186
1337-00-611-4346	BOOSTER MTR	1	MB	745.5	1.3C	EX-8806869	0186
1337-00-646-7324	RKT MTR	1	WB	3020	1.3C	EX-8806870	0186
1337-00-651-2062	RKT MTR	1	MB	5.5	1.3C	EX-8809158	0186
1337-00-658-9736	RKT MTR, MK17 MOD 1	1	MB	43.2	1.3C	EX-8806871	0186
1337-00-696-0832	RKT MTR, MK38 MOD 0	1	MB	91.6	1.3C	EX-8806873	0186
1337-00-706-9510	RKT MTR, MK11 MOD 5	1	WB	28.1	1.3C	EX-8809160	0186
1337-00-706-9522	RKT MTR	1	MB	70.0	1.3C	EX-8806874	0186
1337-00-706-9527	RKT MTR, MK17 MOD 0	1	MB	40.0	1.3C	EX-8809161	0186
1337-00-709-8317	IGNITER, RKT MTR	1	MB	.0150	(04)1.2G	EX-8809162	0314
1337-00-726-4713	RKT MTR	1	MB	2.1	1.3C	EX-8809163	0186
1337-00-727-2820	RKT MTR	9	PL	145.0	1.3C	EX-8809164	0186
1337-00-738-6062	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8809166	0280

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1337-00-740-1280	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8809167	0280
1337-00-764-6337	RKT MTR	1	MB	45,800	1.3C	EX-8809169	0186
1337-00-767-7623	RKT MTR, M46	1	MB	26.5	1.3C	EX-8809170	0186
1337-00-783-5674	RKT MTR, XM22E8	1	MB	620.0	1.3C	EX-8806875	0186
1337-00-788-5395	RKT MTR, M56A1	1	MB	13,680	1.3C	EX-8809171	0186
1337-00-790-4144	IGNITER, RKT MTR	12	WB	.1100	(04)1.2G	EX-8809172	0314
1337-00-793-0855	SQUIB & INSER ASSY	1	FB	.0023	1.4S	EX-8809173	0454
1337-00-796-1628	INITIATOR	1	MB	.0066	1.4G	EX-8809174	0325
1337-00-799-3018	RKT MTR	1	MB	60.0	1.3C	EX-8809175	0186
1337-00-802-0733	SECTOR ASSY	1	MB	.0500	(04)1.2B	EX-8809176	0382
1337-00-804-4368	RKT MTR, MK39 MOD 4	1	MB	92.0	1.3C	EX-8806876	0186
1337-00-804-4382	RKT MTR, MK38 MOD 3	1	MB	91.6	1.3C	EX-8806877	0186
1337-00-831-7891	IGNITER, CUTTER ASSY	1	MB	.0001	1.4S	EX-8809178	0070
1337-00-859-9647	PELLET, IGNITER	1	FB	.0660	1.3C	EX-8809180	0161
1337-00-867-9716	INITIATOR ASSY	1	MB	.0660	(04)1.2G	EX-8809181	0314
1337-00-877-9203	RKT MTR	1	MB	66.0	1.3C	EX-8809182	0186
1337-00-884-8991	ADAPTER & CASE ASSY	1	*	6565	1.3C	EX-8809183	0186
1337-00-885-9120	RKT MTR, MK6 MOD 3	16	PL	70.0	1.3C	EX-8806878	0186
1337-00-885-9122	IGNITER, RKT MTR	1	MB	.1600	(04)1.2G	EX-8806879	0314
1337-00-888-8246	INITIATOR ASSY	1	MB	.0660	(04)1.2G	EX-8809184	0314
1337-00-889-2074	RKT MTR, M100	1	WC	5900	1.3C	EX-8806880	0186
1337-00-891-5463	INITIATOR, RKT MTR	1	MC	.0023	1.4G	EX-8806881	0325
1337-00-891-5470	RKT MTR, M42A1	1	MB	3009	1.3C	EX-8806882	0186
1337-00-891-5471	IGNITER, RKT MTR	1	MB	.3040	1.1G	EX-8806883	0121
1337-00-903-0424	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8809185	0280
1337-00-908-6851	RKT MTR, MK39 MOD 1	1	MB	92.0	1.3C	EX-8806884	0186
1337-00-908-6852	RKT MTR, MK38 MOD 1	1	MB	91.6	1.3C	EX-8806885	0186
1337-00-912-3642	IGNITER, RKT MTR	1	MB	4.0	1.3C	EX-8809186	0186
1337-00-912-3643	RKT MTR	1	MB	.1319	1.3C	EX-8809187	0186
1337-00-912-3644	RKT MTR	1	MB	.0706	1.3C	EX-8809188	0186
1337-00-915-4482	RKT MTR, MK39 MOD 3	1	MB	92.0	1.3C	EX-8806886	0186
1337-00-916-9889	RKT MTR, M55A1	1	MB	45800	1.3C	EX-8809189	0186
1337-00-921-6237	RKT MTR, MK39 MOD 2	1	MB	92.0	1.3C	EX-8806887	0186
1337-00-930-0942	RKT MTR, M57A1	1	MB	3671	1.1C	EX-8809191	0280
1337-00-937-4725	RKT MTR, MK52 MOD 1	1	MB	90.0	1.3C	EX-8806888	0186
1337-00-937-4726	RKT MTR, MK53 MOD 1	1	MB	92.0	1.3C	EX-8806889	0186
1337-00-939-8012	IGNITER ASSY	1	FB	.0070	(04)1.2G	EX-8806890	0314
1337-00-941-0774	IGNITER, GAS GEN	1	MB	.6614	(04)1.2G	EX-8809192	0314
1337-00-948-8150	S&A DEVICE	1	MB	.0007	1.4S	EX-8809193	0349
1337-00-948-8151	IGNITER, RKT MTR	1	MB	6.9	1.3C	EX-8809194	0186
1337-00-952-3951	IGNITER, MK265, MOD 0	1	MB	.2600	(04)1.2G	EX-8809195	0314

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1337-00-953-3505	RKT MTR, M55A1	1	MB	45,800	1.3C	EX-8809196	0186
1337-00-953-3506	RKT MTR, M55A1	1	MB	45,800	1.3C	EX-8809197	0186
1337-00-956-3714	IGNITER, RKT MTR	1	MB	6.9	1.3C	EX-8809198	0186
1337-00-956-3715	BOOSTER, ASSY	1	MB	.0050	1.4G	EX-8809199	0325
1337-00-957-4611	RKT MTR, M56A1	1	MB	10,378	1.3C	EX-8809200	0186
1337-00-958-1844	RKT MTR	1	MB	.0706	1.3C	EX-8809201	0186
1337-00-961-5036	RKT MTR, M56A1	1	MB	10,378	1.3C	EX-8809202	0186
1337-00-962-1669	INITIATOR	1	MB	.0002	1.4S	EX-8809203	0454
1337-00-964-9845	RKT MTR, M57A1	1	MB	3,671	1.1C	EX-8809204	0280
1337-00-967-6729	BASKET ASSY	1	MC	.0132	1.4G	EX-8809205	0325
1337-00-971-7132	RKT MTR	1	MB	13,680	1.3C	EX-8809206	0186
1337-00-971-9523	IGNITER, RKT MTR	1	MB	.0500	1.3C	EX-8809207	0186
1337-00-971-9525	IGNITER, RKT MTR	1	MC	2.3	1.3C	EX-8809208	0186
1337-00-973-0665	RKT MTR, XM100	1	WC	5,900	1.3C	EX-8809209	0186
1337-00-973-3793	S&A DEVICE	1	MB	.0007	1.4S	EX-8809210	0349
1337-00-974-4872	RKT MTR	1	MB	4.5	1.3C	EX-8809211	0186
1337-00-981-0645	RKT MTR, M57A1	1	MB	3,671	1.1C	EX-8809213	0280
1337-00-983-8454	RKT MTR	1	MB	.0765	1.3C	EX-8809214	0186
1337-00-984-4774	RKT MTR	1	MB	.1319	1.3C	EX-8809215	0186
1337-00-987-3984	SECTOR ASSY	1	MB	.0365	(04)1.2B	EX-8809216	0382
1337-00-989-4905	RKT MTR, MK38 MOD 2	1	MB	91.6	1.3C	EX-8806891	0186
1337-00-994-3084	IGNITER, XM69	1	MB	.1330	1.1G	EX-8806892	0121
1337-01-005-3992	RKT MTR, MK58 MOD 2	1	MB	135.2	1.3C	EX-8809217	0186
1337-01-007-0842	RKT MTR, MK58 MODS 0 & 1	1	MB	135.2	1.3C	EX-8809218	0186
1337-01-028-1424	S&A IGNITION ASSY	N/A	N/A	.0008	(04)1.2G	EX-8809219	0314
1337-01-033-9546	RKT MTR, MK27 MOD 6	1	WB	562.0	1.3C	EX-8803690	0186
1337-01-034-3396	RKT MTR, MK58 MOD 3	1	MB	135.2	1.3C	EX-8809220	0186
1337-01-047-9247	IGNITER, MXU-239/A	1	MC	1.3	1.1C	EX-8809221	0280
1337-01-061-8669	RKT MTR, MK36 MOD 7	1	MB	60.0	1.3C	EX-8809222	0186
1337-01-061-9508	RKT MTR, SR-116-HP-1	1	MB	53.0	1.3C	EX-8809223	0186
1337-01-062-6426	RKT MTR	1	MB	13,680	1.3C	EX-8809224	0186
1337-01-065-2388	RKT MTR, MK53 MOD 2	1	MB	89.0	1.3C	EX-8809225	0186
1337-01-072-0890	INITIATOR	1	MC	.0618	(04)1.2G	EX-8809226	0314
1337-01-073-0403	IGNITER, RAM JET	18	MC	.3870	1.3G	EX-8809227	0315
1337-01-074-0479	RKT MTR, SR-116-HP-1	1	MB	53.0	1.3C	EX-8808634	0186
1337-01-081-1716	RKT MTR	1	MB	13,680	1.3C	EX-8809228	0186
1337-01-081-1717	RKT MTR	1	MB	13,680	1.3C	EX-8809229	0186
1337-01-090-9294	RKT MTR, MK36 MOD 8	1	MB	60.0	1.3C	EX-8803694	0186
1337-01-107-2554	RKT MTR, SR-116-AJ-2	1	MB	53.0	1.3C	EX-8808635	0186
1337-01-118-4657	RKT MTR	1	WB	65.0	1.3C	EX-8808636	0186
1337-01-125-9423	INITIATOR ASSY	*	WB	.0008	1.4C	EX-8808637	0366

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1337-01-131-7860	RKT MTR, MK36 MOD 9	4	MB	60.0	1.3C	EX-8711574	0186
1337-01-145-1963	RKT MTR, MK36 MOD 11	4	MB	60.0	1.3C	EX-8809230	0186
1337-01-145-9360	RKT MTR, MK36 MOD 10	4	MB	60.0	1.3C	EX-8809231	0186
1337-01-150-7939	RKT MTR, MK58 MOD 5	1	WB	133.3	1.3C	EX-8711579	0186
1337-01-157-2398	SHROUD	1	WB	6.9	1.3C	EX-8809232	0186
1337-01-160-7899	IGNITER, S&A DEVICE MK299 MOD 0	1	WB	.1640	(04)1.2G	EX-8711580	0314
1337-01-162-3421	ROCKET MTR, YSR113-TC-1	1	MB	280.5	1.3C	EX-8711581	0186
1337-01-193-2643	SHROUD TRACTOR MOTOR	1	WB	30.1	1.3C	EX-8812123	0186
1337-01-193-4250	IGNITER & SAFE/ARM DEVICE	1	WB	.3386	1.3C	EX-8809233	0186
1337-01-193-8050	THRU-BULKHEAD INITIATOR	*	FB	.0016	1.4S	EX-8808638	0384
1337-01-195-1906	FIRING UNIT/EBW INIT ADAPTER ASSY	1	FB	.0021	1.4S	EX-8808639	0367
1337-01-196-7213	FUEL LINE SEVERANCE ASSY	1	FB	.0078	1.4S	EX-8808640	0323
1337-01-196-7214	EBW INITIATOR ADAPTER ASSY	*	FB	.0002	1.4S	EX-8807235	0349
1337-01-206-5635	SHROUD SEPARATION CYLINDER ASSY	1	WB	.0505	1.4C	EX-8808641	0351
1337-01-250-1305	RKT MTR	1	MB	7281.0	1.3C	EX-8808642	0186
1337-01-267-2336	INITIATOR ASSY, ELECTRIC	12	WB	.0018	1.4S	EX-	0366
1337-01-279-7886	ROCKET MOTOR, MX STAGE I	1	MB	99,133	1.3C	EX-	0186
1337-01-279-7887	ROCKET MOTOR, STAGE II	1	MB	54120	1.3C	EX-	0186
1337-01-280-8699	MSL MTR, STAGE III	1	MB	15,606	1.1C	EX-8808643	0280
1337-01-281-2122	ROCKET MOTOR, MX STAGE I	1	MB	99,133	1.3C	EX-	0186
1337-01-304-0042	ROCKET MOTOR	1	WB	65.0	1.3C		0186
1340-00-007-4889	RKT, HE 66MM, M72	15	WB	.8300	1.1E	EX-8811579	0181
1340-00-021-4478	RKT, M72A1	15	WB	.8300	1.1E	EX-8806895	0181
1340-00-021-4491	RKT, M72A2	15	WB	.8300	1.1E	EX-8806896	0181
1340-00-023-2013	RKT MTR	1	PL	145.0	1.3C	EX-8806897	0186
1340-00-038-8185	WARHEAD	14	MC	1.4	1.1D	EX-8809235	0286
1340-00-038-8186	WARHEAD	14	MC	1.4	1.1D	EX-8806900	0286
1340-00-038-8188	WARHEAD	14	MC	1.4	1.1D	EX-8806901	0286
1340-00-038-8189	WARHEAD	14	MC	1.4	1.1D	EX-8809236	0286
1340-00-038-8190	WARHEAD	14	MC	1.4	1.1D	EX-8809237	0286
1340-00-038-8355	WARHEAD	1	WB	15.4	1.1D	EX-8806903	0286
1340-00-038-8445	RKT MTR	1	WB	24.8	1.3C	EX-8809238	0186
1340-00-038-9053	FUZE, RKT, MK176	80	WB	.0016	1.1D	EX-8809239	0408
1340-00-038-9055	FUZE, RKT, MK178	80	WB	.0016	1.1D	EX-8809240	0408
1340-00-062-0035	RKT MTR	1	WB	319.8	1.3C	EX-8809241	0186
1340-00-075-6550	IGNITER, RKT MTR	1	MB	.18	1.3C	EX-8809242	0186
1340-00-093-1065	RKT MTR, 15KS1000	12	PL	72.0	1.3C	EX-8806905	0186
1340-00-093-1069	RKT MTR, 2.2KS11000	1	MB	145.0	1.3C	EX-8806906	0186
1340-00-093-1075	IGNITER, RKT MTR	12	WB	.0750	(04)1.2G	EX-8806907	0314
1340-00-106-6814	RKT, PWN-8B	6	WB	18.2	1.3C	EX-8809243	0186
1340-00-118-9630	RKT MTR	1	WB	319.8	1.3C	EX-8809244	0186

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1340-01-188-2744	RKT MTR, TX-632	1	MB	60.0	1.3C	EX-8809067	0186
1340-01-231-3984	JET THRUST UNIT MK23 MOD 3	1	MB	105.0	1.3C	EX-8708594	0186
1340-01-295-5139	RKT MTR, SR-121-NP-2	1	WB	60.7	1.3C	EX-9109177	0186
1345-00-028-5131	MINE, M16	4	WB	1.2	(08)1.2F	EX-8806969	0294
1345-00-096-3093	MINE, M14	90	WB	.0625	1.1D	EX-8806970	0137
1345-00-710-6946	MINE, M18A1	6	WB	1.5	1.1D	EX-8806978	0137

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1340-00-123-3352	IGNITER, RKT MTR, MK173	8	WB	.4960	(04)1.2G	EX-8806909	0314
1340-00-124-4193	WARHEAD, FLECHETTE, WDU-4A/A	4	WB	.0130	*1.4S	EX-8806910	0012
1340-00-143-6911	RKT PRACT, M73	90	WB	.0270	(04)1.2E	EX-8806912	0182
1340-00-143-7032	RKT, 66MM, M72A1	15	WB	.8300	1.1E	EX-8806913	0181
1340-00-143-7108	RKT, CHEM, 2.75 INCH WP (C)	4	WB	8.7	(04)1.2H	EX-8809245	0245
1340-00-157-5932	WARHEAD, FLECHETTE, WDU-13/A	4	WB	.0130	*1.4S	EX-8809246	0012
1340-00-157-6949	RKT MTR, SR105	6	WB	8.3	1.3C	EX-8809247	0186
1340-00-191-3315	RKT, MK40	4	WB	10.7	1.1E	EX-8806918	0181
1340-00-223-7224	RKT, 2.75 INCH, FLECHETTE	4	WB	6.4	1.3C	EX-8811617	0183
1340-00-239-5923	WARHEAD, M151	12	WB	2.3	1.1D	EX-8806920	0286
1340-00-255-7288	RKT PWN-10A (BX1)	2	WB	37.7	1.3C	EX-8809248	0186
1340-00-255-7288	RKT PWN-10A (BX2)	2	WB	.0200	1.4C	EX-8808591	0276
1340-00-255-7289	RKT PWN-11A (BX1)	2	WB	37.7	1.3C	EX-8809249	0186
1340-00-255-7289	RKT PWN-11A (BX2)	2	WB	.0100	1.4C	EX-8808592	0276
1340-00-255-7383	RKT PWN-12A (BX1)	2	WB	37.7	1.3C	EX-8809250	0186
1340-00-255-7383	RKT PWN-12A (BX2)	2	WB	.0100	1.4C	EX-8808593	0276
1340-00-293-8619	RKT MTR, M3A1C	1	WC	2200.0	1.3C	EX-8809251	0186
1340-00-293-9238	RKT MTR, 762MM, M3A1C	1	WB	2200	1.3C	EX-8809252	0186
1340-00-309-5056	RKT MTR, MK10	1	WB	24.9	1.3C	EX-8809253	0186
1340-00-309-5073	JATO, 14DS1000	1	WB	71.0	1.3C	EX-8809254	0186
1340-00-309-5092	RKT MTR, 15KS1000	12	PL	72.0	1.3C	EX-8809255	0186
1340-00-309-5095	IGNITER, MK165	12	WB	.0750	(04)1.2G	EX-8809256	0314
1340-00-309-5097	RKT HEAD, MK1	4	WB	1.4	1.1D	EX-8806922	0286
1340-00-309-5098	WARHEAD MK5	4	WB	.9200	1.1D	EX-8806923	0286
1340-00-326-6539	IGNITER, RKT MTR, M31A1	1	MC	.3400	(04)1.2G	EX-8809257	0314
1340-00-339-4696	RKT MTR, M3A1C	1	WC	2200.0	1.3C	EX-8809258	0186
1340-00-350-7804	RKT MTR	1	WB	319.8	1.3C	EX-8809259	0186
1340-00-403-5254	CHG KIT, DEMOLITION	1	FB	.0600	(04)1.2B	EX-8809260	0107
1340-00-443-1511	RKT MTR, MK16	1	WB	35.0	1.3C	EX-8806932	0186
1340-00-471-1952	RKT MTR, SR110	2	WB	37.6	1.3C	EX-8806935	0186
1340-00-554-4985	RKT MTR	4	WB	5.9	1.3C	EX-8809262	0186
1340-00-585-4461	FIRING MECH, RKT	1	MB	.0080	1.4S	EX-8809263	0349
1340-00-585-6584	IGNITER, RKT MTR	12	WB	.0750	(04)1.2G	EX-8809264	0314
1340-00-620-3440	RKT MTR, MK4	6	WB	6.4	1.3C	EX-8809265	0186
1340-00-620-3444	RKT MTR, MK4	6	WB	6.4	1.3C	EX-8806936	0186
1340-00-629-2613	RKT MTR, M3A2	1	WC	2200	1.3C	EX-8809266	0186
1340-00-678-6280	CHG KIT	1	WB	.8200	1.1D	EX-8809267	0048
1340-00-689-4075	RKT, 2.75 INCH, H.E.	4	WB	2.0	1.1E	EX-8811628	0181
1340-00-689-4080	WARHEAD, 2.75 INCH, RKT DUAL, M247	4	WB	2.0	1.1D	EX-8811629	0286
1340-00-693-5813	FIRING MECH, RKT	1	MB	.0080	1.4S	EX-8809268	0349
1340-00-725-8382	WARHEAD, M151	192	WB	2.4	1.1D	EX-8806939	0286

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1340-00-725-9484	WARHEAD, M151		192	WB	2.3	1.1D	EX-8806940	0286
1340-00-740-0509	RKT MTR		1	WB	319.8	1.3C	EX-8809270	0186
1340-00-752-7830	RKT MTR, M3A1C		1	WC	2200.0	1.3C	EX-8809271	0186
1340-00-752-7832	RKT MTR, M3A1C		1	WC	2200.0	1.3C	EX-8809272	0186
1340-00-755-9861	IGNITER RKT MTR		1	WB	.1800	1.3C	EX-8809273	0186
1340-00-768-0640	RKT MTR, MK16		1	WB	35.0	1.3C	EX-8806941	0186
1340-00-769-5304	FUZE, RKT, M427		12	WB	.0200	1.1D	EX-8809274	0408
1340-00-778-9485	RKT MTR, 762MM M66		1	WB	1847	1.1C	EX-8809275	0280
1340-00-782-5848	WARHEAD, SMK, 2.75 INCH, M156 WP	(C)	4	WB	2.3	(04)1.2H	EX-8806942	0245
1340-00-782-5849	WARHEAD, SMK, 2.75 INCH, M156 WP	(C)	4	WB	2.3	(04)1.2H	EX-8806943	0245
1340-00-798-4320	BATTERY & CABLE ASSY		1	FB	.0020	1.4S	EX-8809276	0349
1340-00-875-9166	ARMING DEVICE		1	FB	.5270	1.4S	EX-8809277	0367
1340-00-879-3968	WARHEAD, FLECHETTE		4	WB	.0130	*1.4S	EX-8809278	0012
1340-00-890-3903	RKT MTR, PWN-8B		4	WB	18.1	1.3C	EX-8806946	0186
1340-00-890-3904	IGNITER		*	*	.0550	1.3G	EX-8809279	0315
1340-00-910-9694	RKT MTR		6	WB	6.4	1.3C	EX-8809280	0186
1340-00-911-3927	WARHEAD, MK1		14	WB	1.4	1.1D	EX-8806948	0286
1340-00-912-4548	RKT, CHEM, 2.75 INCH WP	(C)	8	WB	8.625	(04)1.2H	EX-8806950	0245
1340-00-926-3992	FUZE, RKT, M427		12	MC	.0250	1.1B	EX-8809281	0106
1340-00-926-4086	RKT, 66MM		15	WB	.8300	1.1E	EX-8806953	0181
1340-00-926-9423	RKT, CHEM, 2.711-INCH WP	(C)	4	WB	8.7	(04)1.2H	EX-8809282	0245
1340-00-935-1946	FUZE, RKT, M427		81	WB	.0200	1.1D	EX-8806954	0408
1340-00-935-1953	RKT, CHEM, 2.75-INCH WP	(C)	4	WB	8.6	(04)1.2H	EX-8806955	0245
1340-00-935-6021	RKT MTR, MK40		6	WB	6.4	1.3C	EX-8806956	0186
1340-00-935-6028	WARHEAD, MK1		4	WB	1.4	1.1D	EX-8809283	0286
1340-00-935-6077	RKT MTR, MK4		6	WB	6.4	1.3C	EX-8806957	0186
1340-00-935-6081	RKT, MK4		4	WB	8.72	1.1E	EX-8711627	0181
1340-00-935-9161	RKT, CHEM, 2.75-INCH WP	(C)	4	WB	8.6	(04)1.2H	EX-8809284	0245
1340-00-935-9285	RKT, 66MM, M72A2		15	WB	.8300	1.1E	EX-8806958	0181
1340-00-973-1928	RKT MTR, M66A1		1	WB	1,847	1.1C	EX-8806959	0280
1340-00-973-3853	RKT MTR		1	MB	247.0	1.1C	EX-8806960	0280
1340-01-010-0991	FIRING MECH		1	MB	.0080	1.4S	EX-8809288	0349
1340-01-029-8012	RKT, 66MM, M72A2		15	WC	.8300	1.1E	EX-8803907	0181
1340-01-048-3955	S&A IGNITION ASSY		N/A	N/A	.0006	(04)1.2G	EX-8809289	0314
1340-01-051-1189	WARHEAD, M257 FLARE		6	WB	5.0	1.3G	EX-8711629	0335
1340-01-097-6365	RKT MTR, MK23 MOD 2		9	PL	108.0	1.3C	EX-8708590	0186
1340-01-104-7841	IGNITER, MK296 MOD 0		8	WB	.3308	(04)1.2G	EX-8708591	0314
1340-01-108-8854	RKT MTR, MK66 MOD 1		6	WB	7.0	1.3C	EX-8810410	0186
1340-01-130-6282	RKT MTR		144	WC	1.1	1.3G	EX-8808644	0016
1340-01-130-6418	IGNITER, RKT MTR		144	WC	.0122	1.4G	EX-8808645	0325
1340-01-154-1679	RKT MTR, MK66 MOD 2		6	WB	7.02	1.3C	EX-8708592	0186

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1345-00-926-3950	MINE, M18A1	6	WB	1.5	1.1D	EX-8806982	0137
1345-01-144-6444	DISP & BOMB, CBU-89/B	2	MB	116.1	1.1D	EX-8808646	0034
1345-01-161-0661	DISP & BOMB, CBU-89(T-2)/B	2	MB	.0942	1.4D		0237
1345-01-162-4296	DISP & BOMB, CBU-89(T-1)/B	2	MB	.0689	1.4D		0237
1345-01-162-4297	DISP & BOMB, CBU-89(T-4)/B	2	MB	.4845	1.4D		0237
1345-01-225-0685	DISP & BOMB, CBU-89/B	2	MB	116.1	1.1D	EX-8808647	0034
1345-01-293-9001	DISP & BOMB, CBU-89A/B	2	MB	116.1	1.1D	EX-8808648	0034
1351-00-477-8846	ARMING DEVICE, DESTRUCT	1	MC	.0216	(04)1.2D	EX-8806985	0409
1351-00-477-8852	MODIFICATION KIT	1	MC	.5900	1.1D	EX-8806986	0042
1365-00-219-8512	SMK POT (DE)	3	WB	11.00	1.4G	EX-8806997	0303
1365-00-283-9046	DISP RIOT CONT AGENT (B)	144	WB	N/A	(C) 6.1G	EX-8806999	2017
1365-00-293-9239	CHEM AGENT, GB (A)	1	MC		(E) 6.1K	EX-8805343	2016
1365-00-383-3909	CHEM AGENT, CN (B)	1250	WB		(C) 6.1G	EX-8805346	2017
1365-00-598-5207	SMK POT, M5HC (DE)	2	WB	32.0	1.4G	EX-9007109	0303
1365-00-690-8656	CS CAPSULES (B)	2500	WB		(C) 6.1G	EX-8809293	2017
1365-00-926-1914	CHEM AGENT, CS-1 (B)	5	WB		(C) 6.1G	EX-8805354	2017
1365-00-935-6016	RIOT CONTROL AGENT (B)	5	WB		(C) 6.1G	EX-8809294	2017
1365-01-003-9143	MINISTREAMER (B)	6	FB	N/A	(C) 6.1G	EX-8809295	2017
1365-01-168-3693	DISP, CHEM, MACE, MKIV B (B)	25	FB	N/A	(C) 6.1G	EX-8410011	2017
1370-00-005-6719	SIGNAL SMK, LUU-10/B (E)	1	MC	10.7	1.4G	EX-8809297	0197
1370-00-009-9596	STARTER, FIRE, M2 (E)	100	WB	.0096	1.3G	EX-8809298	0315
1370-00-025-4896	HEAT SOURCE, IR TRACER (E)	26	WB	1.5	1.3G	EX-8809299	0093
1370-00-028-5114	SIMULATOR, FLASH, ART, M110 (E)	30	WB	.1790	1.3G	EX-8805357	0050
1370-00-028-5252	DETONATOR, SIMULATOR, M80 (E)	2500	WB	.0074	1.1G	EX-8805360	0333
1370-00-028-5255	SIMULATOR, BOOBY TRAP, M119 (E)	150	WB	.0095	1.3G	EX-8805361	0335
1370-00-028-5256	SIMULATOR, BOOBY TRAP, M117 (E)	150	WB	.0060	1.3G	EX-8805362	0335
1370-00-028-5257	SIMULATOR, BOOBY TRAP, M118 (E)	150	WB	.0110	1.3G	EX-8805363	0335
1370-00-028-5923	CTG, PHOTOFLASH, M112A1 (E)	40	WB	.4380	1.1G	EX-8805364	0094
1370-00-028-5924	CTG, PHOTOFLASH, M112 (E)	40	WB	.4380	1.1G	EX-8805365	0094
1370-00-028-5931	FLARE, M8A1 (E)	2	WB	10.3	1.3G	EX-8805368	0093
1370-00-028-5933	FLARE, M9A1 (E)	14	WB	1.4	1.3G	EX-8805369	0093
1370-00-028-5941	FLARE, M76 (E)	1	WB	20.4	1.3G	EX-8805370	0093
1370-00-028-5978	SIGNAL, ILL, AN-M54A1 (E)	80	WB	.0875	1.3G	EX-8809301	0054
1370-00-028-5982	SIGNAL, ILL, AN-M56A1 (E)	80	WB	.0875	1.3G	EX-8805375	0054
1370-00-028-6007	SIMULATOR, PROJECTILE, M74A1 (E)	80	WB	.0825	1.3G	EX-8805378	0335
1370-00-038-4921	MKR, LOCATION, MARINE, MK1 MOD 3 (E)	10	WB	.0650	1.3G	EX-8805381	0054
1370-00-054-5342	FLARE SET, ALA-17 (E)	1	WB	22.9	1.3G	EX-8809302	0093
1370-00-077-3391	FLARE, GUIDED MSL, TAU-56/B (E)	20	WB	2.0	1.3G	EX-8805391	0093
1370-00-088-5658	FLARE, MK45 MOD 0 (E)	36	PL	18.0	1.3G	EX-8805394	0093

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1370-00-092-9922	SIGNAL, SMK & ILL, MK5 MOD 4 (E)	8	WB	1.2	1.3G	EX-8805397	0054
1370-00-096-3135	FUSEE, WARNING, RR, M72 (E)	40	WB	.5600	(H) 4.1G	EX-8805402	1325
1370-00-096-3137	SIGNAL, ILL, M131 (E)	25	WB	.1140	1.3G	EX-8805403	0054
1370-00-104-5614	FLARE, TGT, MKR, LUU-1B (E)	36	WC	16.0	1.3G	EX-8809306	0093
1370-00-115-3432	SIGNAL, SMK & ILL, MK13 MOD 0 (E)	108	WC	.2120	1.4G	EX-8805407	0191
1370-00-135-1590	FLARE, TGT, MKR, LUU-5 (E)	36	WC	16.0	1.3G	EX-8809307	0093
1370-00-135-1601	CTG, CHAFF	40	WB	.0043	1.4S	EX-8809308	0323
1370-00-135-2870	FLARE, MK24 MOD 4 (E)	36	WC	16.0	1.3G	EX-8805408	0093
1370-00-166-2160	FLARE, MJU-3A/B (E)	2	WB	21.8	1.3G	EX-8809309	0093
1370-00-219-8566	STARTER, FIRE, M2 (E)	500	WB	.0096	1.3G	EX-8805413	0315
1370-00-249-9410	FLARE, DECOY, MK50 MOD 0 (DE)	80	WB	.2100	1.3G	EX-8805426	0093
1370-00-292-8411	FLARE, ACFT, LUU-2A/B (E)	48	PL	22.0	1.3G	EX-8805427	0093
1370-00-309-5021	MKR, LOCATION, MARINE, MK2 (DE)	20	WB	1.2	(H) 4.1L	EX-8805431	1325
1370-00-309-5028	SIGNAL, SMK & ILL, MK13 MOD 0 (E)	108	WB	.2120	1.4G	EX-8805432	0191
1370-00-351-0222	FLARE, LUU-2/B (E)	36	WC	22.0	1.3G	EX-8809311	0093
1370-00-445-8926	CTG ASSY, FLARE (E)	8	WB	2.8	1.3G	EX-8809313	0092
1370-00-490-7362	SIGNAL, KIT, A/P-25S-5A (E)	100	WB	.0812	1.3G	EX-8809314	0093
1370-00-490-7363	SIGNAL, ILL, RED (E)	200	WB	.0812	1.3G	EX-8805439	0054
1370-00-490-7364	SIGNAL, ILL, GREEN (E)	200	WB	.0812	1.3G	EX-8805440	0054
1370-00-490-7365	SIGNAL, ILL, WHITE (E)	200	WB	.0812	1.3G	EX-8805441	0054
1370-00-567-2817	SIGNAL, MK13 MOD 0, SMK & ILL (E)	36	WB	.2120	1.4G	EX-8801351	0191
1370-00-617-2451	CHAFF PKG, RR141A/L	58	WB	.0004	1.4S	EX-8809315	0173
1370-00-618-2401	SIGNAL, ILL, AN-M37A2 (E)	80	WB	.1437	1.3G	EX-8805450	0054
1370-00-618-2402	SIGNAL, ILL, AN-M45A2 (E)	80	WB	.1062	1.3G	EX-8805451	0054
1370-00-618-2403	SIGNAL, ILL, AN-M40A2 (E)	80	WB	.1437	1.3G	EX-8805452	0054
1370-00-618-5774	SIGNAL, ILL, AN-M55A2 (E)	80	WB	.0857	1.3G	EX-8805453	0054
1370-00-618-5775	SIGNAL, ILL, AN-M56A2 (E)	80	WB	.0857	1.3G	EX-8805454	0054
1370-00-618-5776	SIGNAL, ILL, AN-M57A2 (E)	80	WB	.0857	1.3G	EX-8805455	0054
1370-00-618-5777	SIGNAL, ILL, AN-M58A2 (E)	80	WB	.0857	1.3G	EX-8805456	0054
1370-00-618-5784	SIGNAL, ILL, AN-M39A2 (E)	80	WB	.1437	1.3G	EX-8805457	0054
1370-00-618-5786	SIGNAL, ILL, AN-M38A2 (E)	80	WB	.1437	1.3G	EX-8805458	0054
1370-00-618-5788	SIGNAL, ILL, AN-M41A2 (E)	80	WB	.1437	1.3G	EX-8805459	0054
1370-00-618-5789	SIGNAL, ILL, AN-M42A2 (E)	80	WB	.1437	1.3G	EX-8805460	0054
1370-00-618-5790	SIGNAL, ILL, AN-M43A2 (E)	80	WB	.1062	1.3G	EX-8805461	0054
1370-00-618-5791	SIGNAL, ILL, AN-M44A2 (E)	80	WB	.1062	1.3G	EX-8805462	0054
1370-00-618-5793	SIGNAL, ILL, AN-M53A2 (E)	80	WB	.0875	1.3G	EX-8805463	0054
1370-00-618-5794	SIGNAL, ILL, AN-M54A2 (E)	80	WB	.0875	1.3G	EX-8805464	0054
1370-00-670-5793	FLARE, AERIAL INFRARED, TAU-15/B (E)	25	FB	.9400	1.3G	EX-8809317	0093
1370-00-690-1458	MKR, LOCATION, MARINE, MK25 MOD 3 (E)	224	PL	2.0	1.3G	EX-8805467	0195
1370-00-725-7849	SIGNAL, SMK & ILL, MK6 MOD 3 (E)	4	WB	4.0	1.3G	EX-8805475	0254

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1370-00-752-8060	FLARE, M49A1	(E)	32	WB	.3000	1.3G	EX-8807253	0092
1370-00-752-8124	SIMULATOR, HAND GRENADE, M116A1	(E)	150	WB	.0813	1.3G	EX-8805476	0335
1370-00-752-8126	SIMULATOR, PROJECTILE, M115A2	(E)	100	WB	.1410	(04)1.2G	EX-8805477	0334
1370-00-753-1859	SIGNAL, ILL, M127A1	(E)	36	WB	.1800	1.3G	EX-8805478	0054
1370-00-767-7622	FLARE, IR, W112/B	(E)	48	WB	.2700	1.3G	EX-8809318	0093
1370-00-787-2788	FLARE, MSL, MK27 MOD 0	(E)	20	MB	.0700	1.3G	EX-8805482	0093
1370-00-800-9973	FUSEE, RED, 15 MINUTE		72	FB	.2075	(H) 4.1G	EX-8805484	1325
1370-00-862-6114	FLARE, SET ALA-17	(E)	1	WB	22.9	1.3G	EX-8809319	0093
1370-00-901-0605	CTG, PHOTOFLASH, M123A1	(E)	12	WB	1.8	1.1G	EX-8805492	0094
1370-00-918-7052	FLARE, ACFT, MK24 MOD 4	(E)	6	WC	16.0	1.3G	EX-8805493	0093
1370-00-921-6172	SIGNAL KIT, A/P-25-S-1	(E)	50	FB	.0560	1.3G	EX-8809320	0093
1370-00-984-4472	FLARE, ACFT, M9A1	(E)	14	WB	1.3	1.3G	EX-8805504	0093
1370-01-018-9288	CTG ASSY, FLARE, ALA-17A	(E)	8	WB	2.8	1.3G	EX-8809321	0093
1370-01-030-8330	SIGNAL, SMK & ILL, MK124 MOD 1	(E)	108	WB	.2000	1.4G	EX-8805505	0191
1370-01-033-3395	FLARE, LUU-4/B	(E)	36	PL	12.3	1.3G	EX-8809322	0093
1370-01-038-5111	FLARE, MJU-7/B	(E)	15	WB	.6278	1.3G	EX-8809323	0093
1370-01-039-2827	FLARE, DECOY, MJU-2/B	(E)	26	WB	.4900	1.3G	EX-8801399	0093
1370-01-048-2138	FLARE, M206	(E)	100	WC	.2866	1.3G	EX-8810416	0093
1370-01-071-1044	CTG, CHAFF RR-141D/AL		58	WB	.0004	1.4S	EX-8809325	0173
1370-01-073-6281	FLARE, RR-119/B	(E)	26	WB	1.5	1.3G	EX-8808649	0093
1370-01-074-0591	MKR MARINE, MK58 MOD 1	(E)	2	MC	4.85	1.3G	EX-8710527	0335
1370-01-083-0320	FLARE, KIT, LUU-2B/B	(E)	36	WC	22	1.3G	EX-8809326	0093
1370-01-083-0322	FLARE, KIT, LUU-2B/B	(E)	36	WC	22	1.3G	EX-8809327	0093
1370-01-083-0323	FLARE, LUU-2B/B	(E)	2	WB	22	1.3G	EX-8809328	0093
1370-01-160-9174	SIMULATOR, IR FLARE SD-206		60	WB	.0783	1.4G	EX-8808650	0197
1370-01-162-4199	SIMULATOR, IR FLARE SD-007		60	WB	.0783	1.4G	EX-8808651	0197
1370-01-167-9561	SIMULATOR, IR FLARE SD-002		26	WB	.0812	1.4G	EX-8808652	0197
1370-01-180-5856	PROJECTILE, AIRBURST PJU-7/E		48	WB	.4850	1.1G	EX-9011141	0049
1370-01-181-1336	LAUNCH CHARGE, CCK-77/E		49	WB	.0045	1.4C	EX-9011139	0276
1370-01-187-8390	FLARE, MJU-7/B	(E)	15	WB	.6278	1.3G	EX-8809329	0093
1370-01-204-1525	CTG, BIRDSCARE, 12 GAGE, PGU-26P		500	FB	.0059	*1.4S	EX-8808653	0012
1370-01-209-8783	FLARE, ALA-17B	(E)	8	WB	2.8	1.3G	EX-8912140	0093
1370-01-234-0718	CTG, CHAFF RR-141E/AL		56	WB	.0004	1.4S	EX-8809330	0173
1370-01-254-3481	SIMULATOR, FLARE MJU-2(T-1)/B		26	WB	.0812	1.4G	EX-8809331	0197
1370-01-254-3482	SIMULATOR, FLARE MJU-7(T-1)/B		60	WB	.0783	1.4G	EX-8809332	0197
1370-01-254-3483	SIMULATOR, FLARE M206(T-1)		60	WB	.0783	1.4G	EX-8809333	0197
1370-01-257-8901	FLARE, MJU-23/B	(E)	12	WB	2.7	1.3G	EX-8808654	0093
1370-01-263-1602	FLARE IR, MJU-10/B	(E)	24	WB	2.0	1.3G	EX-8907074	0093
1370-01-279-9505	PROJECTILE, AIRBURST PJU-7A/E		48	WB	.4850	1.3G	EX-9011140	0335
1370-01-284-5619	SIGNAL, SMOKE, MK 6 MOD 5		4	WB	4.0	1.3G	EX-8710548	0254
1370-01-296-8395	FLARE, MJU-7A/B	(E)	15	WB	.6278	1.3G	EX-8809334	0093

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1370-01-299-6008	FLARE, IR, W112/B		80	WB	.2700	1.3G	EX-	0093
1370-01-325-4959	SIMULATOR, IR FLARE MJU-10(T-1)/B		24	WB	.0783	1.4G	EX-8809333	0197
1370-01-331-2545	SIMULATOR, FLARE MJU-2(T-2)/B		26	WB	.0812	1.4G	EX-8809331	0197
1370-01-331-2546	SIMULATOR, FLARE M206(T-2)		60	WB	.0783	1.4G	EX-8809333	0197
1370-01-331-2547	SIMULATOR, FLARE MJU-7(T-2)/B		60	WB	.0783	1.4G	EX-8809332	0197
1370-01-331-3485	FLARE, LUU-2B/B	(E)	4	WB	22.0	1.3G	EX-8809328	0093
1370-01-335-5053	FLARE, LUU-4/B	(E)	4	WB	12.3	1.3G		0093
1370-01-335-6074	FLARE, LUU-5/B	(E)	4	WB	16.0	1.3G		0093
1370-01-335-6075	FLARE, LUU-1/B	(E)	4	WB	16.0	1.3G		0093
1375-00-028-5140	CHG, DEMOLITION		96	WB	.5000	1.1D	EX-8805515	0048
1375-00-028-5142	CHG, DEMOLITION		48	WB	1.0	1.1D	EX-8805516	0048
1375-00-028-5145	CHG, DEMOLITION		1	WB	40.0	1.1D	EX-8805517	0048
1375-00-028-5148	CHG DEMOLITION		24	WB	2.5	1.1D	EX-8805519	0048
1375-00-028-5151	FUSE, BLASTING, TIME		80	WB	.3500	1.4S	EX-8805522	0105
1375-00-028-5161	CORD, DET		50	WB	.6000	1.1D	EX-8805523	0065
1375-00-028-5168	CORD, DET		8	WB	3.5	1.1D	EX-8810418	0065
1375-00-028-5180	FIRING DEVICE, M1A1		250	WB	.0001	1.4S	EX-8805527	0349
1375-00-028-5187	FIRING DEVICE, M1		80	WB	.0001	1.4S	EX-8809335	0349
1375-00-028-5189	FIRING DEVICE, M3		150	WB	.0001	1.4S	EX-8805529	0349
1375-00-028-5190	FIRING DEVICE, M5		200	WB	.0001	1.4S	EX-8805530	0349
1375-00-028-5192	FIRING DEVICE, M5		200	WB	.0001	1.4S	EX-8805531	0349
1375-00-028-5200	IGNITER, TIME, BLASTING		250	WB	.0001	1.4S	EX-8805536	0131
1375-00-028-5202	PRIMER, PERCUSSION		5000	WB	.0001	1.4S	EX-8805537	0044
1375-00-028-5224	CAP, BLASTING		500	WB	.0020	1.1B	EX-8805540	0030
1375-00-028-5226	CAP, BLASTING		5000	WB	.0020	1.1B	EX-8805541	0029
1375-00-028-5228	CAP, BLASTING		*	*	.0020	1.1B	EX-8805542	0029
1375-00-028-5237	CHG, DEMOLITION, M2A3		3	WB	11.5	1.1D	EX-8805543	0048
1375-00-028-5241	CHG, DEMOLITION		1	WB	30.0	1.1D	EX-8805544	0048
1375-00-028-5245	CHG, DEMOLITION, M37		2	WB	20.0	1.1D	EX-8805545	0048
1375-00-028-5246	FUSE, BLASTING, TIME		80	WB	.3500	1.4S	EX-8805546	0105
1375-00-028-5247	DEMOLITION KIT, M1A1		1	WB	89.2	1.1D	EX-8710553	0034
1375-00-041-1312	CAP, BLASTING, E81		50	MB	.0020	1.4B	EX-8503022	0255
1375-00-062-7313	BOOSTER, CORD, DET		1	FB	.0024	1.1B	EX-8809336	0225
1375-00-074-3196	CAP, BLASTING		*	*	.0005	1.4B	EX-8503023	0255
1375-00-077-3390	INITIATOR		1	MB	.0065	1.4B	EX-8809337	0257
1375-00-078-0450	DOCUMENT DEST (DE)		1	MC	212.2	1.3G	EX-8809338	0010
1375-00-078-4295	CORD, DET		100	WB	.0143	1.1D	EX-8809339	0065
1375-00-088-6691	CHG, DEMOLITION		1	WB	30.0	1.1D	EX-8805556	0048
1375-00-096-3095	DYNAMITE		100	WB	.5000	1.1D	EX-8809340	0081
1375-00-096-3098	DYNAMITE		211	WB	.5000	1.1D	EX-8809341	0081
1375-00-096-3099	DYNAMITE		100	WB	.5000	1.1D	EX-8809342	0081

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1375-00-096-3100	DYNAMITE	100	WB	4.6	1.1D	EX-8809343	0081

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1375-00-180-9356	CORD, DET	3	WB	7.0	1.1D	EX-8810423	0065
1375-00-204-0851	CORD, DET	3	WB	7.0	1.1D	EX-8810425	0065
1375-00-219-8562	CRYPTO, EQUIP, DEST, M1A1, TH (DE)	1	WB	28.0	1.3G	EX-8805562	0010
1375-00-219-8563	CRYPTO, EQUIP, DEST, M2A1, TH (DE)	2	WB	8.5	1.3G	EX-8805563	0010
1375-00-219-8564	FILE, DEST, M4 (DE)	1	WB	76.0	1.3G	EX-8805564	0010
1375-00-327-6759	CAP, BLASTING	1	FB	.0005	1.4B	EX-8805571	0365
1375-00-383-3908	CRYPTO EQUIP, DEST, M1A2, TH (DE)	1	WB	28.0	1.3G	EX-8805572	0010
1375-00-482-2053	DESTRUCTOR, INITIATOR	1	WB	.2900	1.1D	EX-8809346	0043
1375-00-516-9927	CAP, BLASTING	*	WB	.0003	1.1B	EX-8809347	0030
1375-00-529-8004	DOCUMENT DEST, M3 (DE)	1	WB	100.0	1.3G	EX-8805580	0010
1375-00-542-0090	DOCUMENT DEST, M3 (DE)	1	WB	100.0	1.3G	EX-8805590	0010
1375-00-580-1392	FIRING DEVICE	200	WB	.0001	1.4S	EX-8805592	0349
1375-00-691-1671	IGNITER, TIME, BLASTING	300	WB	.0001	1.4S	EX-8805595	0131
1375-00-699-5236	COUPLING BASE, FIRING	N/A	N/A	.0001	1.4S	EX-8805596	0044
1375-00-707-3044	CAP, BLASTING	100	WB	.0005	1.4B	EX-8503024	0365
1375-00-724-7040	CHG, DEMOLITION	30	WB	1.25	1.1D	EX-8805597	0048
1375-00-724-9613	DYNAMITE MILITARY, M1	100	WB	.3900	1.1D	EX-8805598	0082
1375-00-728-5941	CHG, DEMOLITION	20	WB	2.0	1.1D	EX-8805599	0048
1375-00-728-7762	CHG, DEMOLITION	6	WC	.3216	1.1D	EX-8805600	0048
1375-00-756-1864	CAP, BLASTING	600	WB	.0027	1.1B	EX-8805602	0029
1375-00-756-1865	CAP, BLASTING	900	WB	.0019	1.1B	EX-8805603	0030
1375-00-772-1369	PROPELLANT, IMR4350	*	*	1.0	1.3C	EX-8809350	0161
1375-00-772-1370	PROPELLANT, IMR4064	*	*	1.0	1.3C	EX-8809351	0161
1375-00-781-9066	CHG, DEMOLITION, MK45	12	WB	.0728	1.1D	EX-8805604	0048
1375-00-782-5527	CORD, DET	8	WB	7.0	1.1D	EX-8810427	0065
1375-00-834-8884	CRYPTO, EQUIP, DEST, M1A2, TH (DE)	1	WB	28.0	1.3G	EX-8805607	0010
1375-00-834-8885	CRYPTO, EQUIP, DEST, M2A1, TH (DE)	2	WB	8.5	1.3G	EX-8805608	0010
1375-00-854-0884	INITIATOR, EXPL	1	MB	.0005	1.4B	EX-8809353	0257
1375-00-926-3939	CHG, DML, SHAPED, 15 LB, M2A4	3	WB	11.5	1.1D	EX-8805611	0048
1375-00-926-3985	CHG, DEMOLITION, M183	2	WB	20.0	1.1D	EX-8805612	0048
1375-00-926-9316	CHG, DEMOLITION	96	WB	.5	1.1D	EX-8805613	0048
1375-00-935-1924	CHG, DEMOLITION, M2A3	3	WB	11.5	1.1D	EX-8805614	0048
1375-00-935-6139	CHG, DEMOLITION, 1 LB, TNT	48	WB	1.0	1.1D	EX-8809354	0048
1375-00-952-5055	DESTRUCTOR, EXPL	1	FB	1.0	1.1D	EX-8809355	0034
1375-00-965-0800	CORD, DET	6	WB	7.0	1.1D	EX-8810428	0065
1375-01-003-9072	DET	1	FB	.0014	1.4B	EX-8809356	0257
1375-01-003-9074	LEAD ASSY	1	FB	.0091	1.4B	EX-8809357	0257
1375-01-023-7994	CHG, DML, SHAPED, 15 LB, M2A4	4	WB	11.5	1.1D	EX-8710561	0048
1375-01-037-5428	CUTTER, MK23	6	MB	.2855	1.1D	EX-8805625	0048
1375-01-037-5429	CUTTER, MK24	2	MB	1.2	1.1D	EX-8805626	0048
1375-01-040-1526	FIRING DEVICE, M142	56	WB	.0001	1.4S	EX-8610020	0044

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1375-01-057-6439	CAP, BLASTING, M7	100	WB	.0027	1.1B	EX-8809358	0029
1375-01-068-3984	CHARGE, DEMO MK 88 MOD 0	5	MB	.0002	1.4D	EX-8710564	0410
1375-01-068-3985	CHARGE, DEMO, MK86 MOD 0	5	MB	.0007	1.1D	EX-8710565	0048
1375-01-069-6671	CHARGE, DEMO, MK87 MOD 0	5	MB	.0009	1.1D	EX-8710566	0048
1375-01-069-6672	CHARGE, DEMO, MK89 MOD 0	5	MB	.0032	1.1D	EX-8710567	0048
1375-01-081-2758	CUTTING TORCH (E)	N/A	N/A	1.4	1.4G	EX-8710579	0325
1375-01-082-9919	FLSC	6	WB	.0171	1.1D	EX-8710580	0288
1375-01-082-9920	FLSC	6	WB	.0228	1.1D	EX-8710581	0288
1375-01-082-9921	FLSC	6	WB	.0428	1.1D	EX-8710582	0288
1375-01-082-9922	FLSC	5	WB	.0714	1.1D	EX-8710583	0288
1375-01-082-9923	FLSC	5	WB	.1285	1.1D	EX-8710584	0288
1375-01-082-9924	FLSC	5	WB	.1714	1.1D	EX-8710585	0288
1375-01-082-9925	FLSC	3	WB	.2857	1.1D	EX-8710586	0288
1375-01-083-2820	FLSC	6	WB	.0114	1.1D	EX-8710589	0288
1375-01-083-2821	FLSC	3	WB	.3428	1.1D	EX-8710590	0288
1375-01-083-2822	FLSC	6	WB	.0342	1.1D	EX-8710591	0288
1375-01-083-6325	FLSC	3	WB	.2285	1.1D	EX-8810592	0288
1375-01-122-7640	PRIMER, M29A1	100	FB	.0001	1.4S	EX-8710602	0044
1375-01-180-5779	WATER GEL	6	FB	.5000	1.1D	EX-8808655	0241
1375-01-192-7411	CANINE EXP SCENT KIT	1	WB	18.0	1.1D	EX-8808656	0048
1375-01-192-9174	CAP, BLASTING, M6	180	WB	.0028	1.1B	EX-8710615	0030
1375-01-193-2976	CAP, BLASTING, M7	480	WB	.0027	1.1B	EX-8710616	0029
1375-01-329-0775	DYNAMITE, AMON NITRATE 50%	100	WB	.5000	1.1D	EX-	0081
1375-01-333-1893	DYNAMITE, NITROGLYCERIN 50%	100	FB	.5000	1.1D		0081
1376-00-277-2413	DET,STAB, M55	N/A	N/A	N/A	1.4B	EX-8810430	0365
1376-00-628-3333	TNT, FLAKED, TYPE 1	1	FB	55.0	1.1D	EX-8801519	0209
1376-00-709-8320	PROPELLANT GRAIN	*	MC	.6600	1.3C	EX-8809362	0274
1376-01-204-9783	PROPELLANT (INFALLIBLE)				1.1C	EX-	0160
1376-01-204-9784	BKN03 2R PELLETS				1.3C	EX-	0161
1376-01-204-9785	PROPELLANT (H8)				1.3C	EX-	0161
1376-01-204-9786	PROPELLANT NOSOL-318				1.3C	EX-	0161
1377-00-003-7269	CTG, DELAY, CCU-18/B	*	WB	.0038	1.4S	EX-8809363	0323
1377-00-003-7270	CTG, DELAY, CCU-17/B	*	WB	.0039	1.4S	EX-8809364	0323
1377-00-006-7879	INITIATOR, JAU-13/A	1	FB	.0001	1.4C	EX-8805630	0276
1377-00-006-7880	INITIATOR, JAU-14/A	1	FB	N/A	1.4C	EX-8805631	0276
1377-00-009-6045	EXPL JETT SET	1	MC	.0119	1.4B	EX-8809365	0257
1377-00-009-6046	EXPL JETT SET	1	MC	.0070	1.4B	EX-8809366	0257
1377-00-009-6047	EXPL JETT SET	1	MC	.0046	1.4B	EX-8809367	0257
1377-00-011-3427	CTG, IGNITION	1	FB	.0420	1.4G	EX-8805637	0325
1377-00-011-9082	PARTS KIT, CUTTER	1	FB	.0002	1.4S	EX-8809368	0070
1377-00-016-4805	PARA KIT	4	WB	.1502	1.4S	EX-8809369	0323

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-017-0682	CTG, DELAY	24	WB	.0003	1.4S	EX-8805638	0323
1377-00-021-4213	CTG, IMPULSE, MK17 MOD 1	384	MC	.0031	1.4C	EX-8805639	0276
1377-00-027-1124	CTG, IMPULSE	1	FB	.0176	(04)1.2C	EX-8811845	0381
1377-00-028-6128	CTG, IMPULSE, M29A2	300	FB	.0210	1.4C	EX-8805644	0276
1377-00-028-6129	CTG, IMPULSE, M28A1	2	MB	.2000	1.4C	EX-	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-029-3659	INITIATOR, XM120	20	FB	.0110	1.4C	EX-8809372	0276
1377-00-035-6021	SQUIB, ELEC, S68-6	50	FB	.0009	1.4S	EX-8805645	0454
1377-00-035-6024	SQUIB, ELEC, S68-15	50	FB	.0021	1.4S	EX-8805646	0454
1377-00-041-1313	SQUIB, ELEC, S68-4	50	FB	.0006	1.4S	EX-8805649	0454
1377-00-042-9551	CTG, ACFT FIRE EXT	1	FB	.0009	1.4S	EX-8805650	0323
1377-00-050-6793	CUTTER, CTG, ACTUATED	1	FB	.0009	1.4S	EX-8809374	0070
1377-00-051-7574	CUTTER, CTG, ACTUATED	1	MB	.0009	1.4S	EX-8809375	0070
1377-00-051-7575	CUTTER, CTG, ACTUATED	1	MB	.0009	1.4S	EX-8809376	0070
1377-00-051-9053	SEVERANCE ASSY	1	FB	.0047	1.4S	EX-8809377	0367
1377-00-051-9088	COVER ASSY	1	FB	.0066	1.4S	EX-8809379	0367
1377-00-054-5331	EJECTOR, PARA	1	FB	.0059	1.4S	EX-8809381	0323
1377-00-060-0885	CUTTER, CTG, ACTUATED	80	WB	.0040	1.4S	EX-8805652	0070
1377-00-060-0886	CUTTER, CTG, ACTUATED	80	WB	.0064	1.4S	EX-8805653	0070
1377-00-061-8045	CATAPULT, ACFT	1	WB	6.3	1.3C	EX-8805656	0186
1377-00-061-8046	CATAPULT, ACFT	1	WB	6.3	1.3C	EX-8805657	0186
1377-00-061-8047	CATAPULT, ACFT	1	WB	6.3	1.3C	EX-8805658	0186
1377-00-062-0038	CTG, ENG, STARTER, MXU-4A/A	96	WB	8.0	1.4C	EX-8805659	0276
1377-00-062-0192	CORD ASSY, DET	1	FB	.0004	1.4S	EX-8809382	0349
1377-00-062-0203	INITIATOR, DELAY	1	FB	.0018	1.4C	EX-8809383	0276
1377-00-062-0219	SEVERANCE ASSY	1	FB	.0370	1.4S	EX-8809384	0367
1377-00-062-0221	SEVERANCE ASSY	1	FB	.0370	1.4S	EX-8809385	0367
1377-00-062-5879	INITIATOR, M72	20	FB	1.0	1.4C	EX-8805660	0276
1377-00-062-5880	CTG, DELAY	400	WB	.0120	1.4C	EX-8805661	0276
1377-00-063-4546	EJECTOR, PARA	1	FB	.0059	1.4S	EX-8805662	0323
1377-00-064-6654	EXPL KIT, MLU-7/B	96	WB	.0105	1.4S	EX-8809386	0367
1377-00-065-4619	CTG, IMPULSE, MK47 MOD 0	25	FB	.0446	1.4C	EX-8805663	0276
1377-00-066-1560	CTG, DELAY, MK4 MOD 1	25	FB	.0002	1.4S	EX-8805664	0323
1377-00-066-1561	CTG, DELAY, MK5 MOD 1	25	FB	.0002	1.4S	EX-8805665	0323
1377-00-068-0256	CATAPULT, ACFT	1	WB	6.3	1.3C	EX-8805666	0186
1377-00-070-2485	CUTTER, CTG, ACTUATED	1	MB	.0001	1.4S	EX-8809388	0070
1377-00-070-2490	CTG, DELAY	1	FB	.0025	1.4S	EX-8805667	0323
1377-00-074-3200	CONNECTOR, MANIFOLD ASSY	1	FB	.0004	1.4S	EX-8809389	0349
1377-00-075-5846	CTG, IMPULSE, MK8 MOD 0	10	MC	.0438	1.4C	EX-8908010	0276
1377-00-078-1841	COVER ASSY	1	FB	.0049	1.4S	EX-8809390	0367
1377-00-078-6345	CATAPULT, ACFT	2	WB	6.3	1.3C	EX-8805669	0186
1377-00-079-3999	THRUSTER	1	FB	.0023	1.4S	EX-8805670	0323
1377-00-079-4000	SLIDE BLOCK ASSY	1	FB	.0127	1.4S	EX-8809391	0367
1377-00-079-4002	CORD ASSY, DET	1	FB	.0048	1.4D	EX-8809392	0289
1377-00-079-4003	CORD ASSY, DET	1	FB	.0057	1.4D	EX-8809393	0289
1377-00-079-4007	MANIFOLD ASSY	1	FB	.0004	1.4B	EX-8809394	0257
1377-00-083-8754	CTG, IMPULSE, MK49 MOD 0	25	FB	.0003	1.4C	EX-8805672	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-087-7103	CTG, ACFT FIRE EXT	1	FB	.0009	1.4S	EX-8809395	0323
1377-00-088-5632	CATAPULT, RKT	2	WB	10.0	1.3C	EX-8805674	0275
1377-00-095-5805	CTG	*	*	.0016	1.4S	EX-8809396	0174
1377-00-095-9917	CTG, EXPL BOLT	10	FB	.0110	(04)1.2B	EX-8809397	0107
1377-00-100-0128	ACTUATOR, ASSY	1	FB	.0154	1.4C	EX-8809398	0276
1377-00-100-0129	ACTUATOR, ASSY	1	FB	.0154	1.4C	EX-8809399	0276
1377-00-102-5343	CORD ASSY, DET	1	FB	.0052	1.4D	EX-8809400	0289
1377-00-102-5344	CORD ASSY, DET	1	FB	.0060	1.4D	EX-8809401	0289
1377-00-102-5345	CORD ASSY, DET	1	FB	.0063	1.4D	EX-8809402	0289
1377-00-102-5346	CORD ASSY, DET	1	FB	.0073	1.4D	EX-8809403	0289
1377-00-102-5347	CORD ASSY, DET	1	FB	.0077	1.4D	EX-8809404	0289
1377-00-102-5348	CORD ASSY, DET	1	FB	.0084	1.4D	EX-8809405	0289
1377-00-102-5349	CORD ASSY, DET	1	FB	.0095	1.4D	EX-8809406	0289
1377-00-102-5350	CORD ASSY, DET	1	FB	.0101	1.4D	EX-8809407	0289
1377-00-102-5353	CORD ASSY, DET	1	FB	.0069	1.4D	EX-8809408	0289
1377-00-103-3434	CTG, IMPULSE, MK2 MOD 1	10	MC	.0139	1.4C	EX-8810218	0276
1377-00-105-6659	CTG, DELAY, MK4 MOD 2	4	MC	.0003	1.4S	EX-8805675	0323
1377-00-105-6661	CTG, DELAY, MK5 MOD 2	4	MC	.0003	1.4S	EX-8805676	0323
1377-00-106-7771	GUN & CABLE ASSY	1	FB	.0024	1.4S	EX-8809409	0323
1377-00-106-7772	DROGUE GUN ASSY	1	FB	.0065	1.4S	EX-8809410	0323
1377-00-106-7792	CTG, IMPULSE, MK124 MOD 0	10	MC	.0189	1.4C	EX-8805678	0276
1377-00-109-1580	KIT, EMERGENCY EXIT	1	WB	20.0	1.4S	EX-8809411	0367
1377-00-110-6579	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809412	0349
1377-00-110-6580	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809413	0349
1377-00-110-6581	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809414	0349
1377-00-110-6582	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809415	0349
1377-00-110-6583	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809416	0349
1377-00-110-6584	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809417	0349
1377-00-110-6585	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809418	0349
1377-00-110-6586	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809419	0349
1377-00-110-6587	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809420	0349
1377-00-110-6588	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809421	0349
1377-00-110-6589	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809422	0349
1377-00-110-6590	CORD ASSY, DET	1	FB	.0017	1.4S	EX-8809423	0349
1377-00-110-6591	CORD ASSY, DET	1	FB	.0019	1.4S	EX-8809424	0349
1377-00-110-6592	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809425	0349
1377-00-110-6593	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809426	0349
1377-00-112-2606	BOLT, EXPL	25	WB	.0013	1.4S	EX-8809427	0173
1377-00-113-6882	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809428	0349
1377-00-113-6883	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809429	0349
1377-00-113-6884	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809430	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-113-6885	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809431	0349
1377-00-113-6886	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809432	0349
1377-00-113-9049	CTG, IMPULSE, EX80 MOD 0	1	FB	.0003	1.4C	EX-8809433	0276
1377-00-115-4607	CATAPULT, ACFT, M38	1	WB	6.7	1.3C	EX-8809434	0186
1377-00-115-7442	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809435	0349
1377-00-115-7443	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809436	0349
1377-00-115-7444	CORD ASSY, DET	1	FB	.0005	1.4S	EX-8809437	0349
1377-00-115-7445	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809438	0349
1377-00-115-7446	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809439	0349
1377-00-115-7447	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809440	0349
1377-00-115-7448	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809441	0349
1377-00-115-7449	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809442	0349
1377-00-115-7450	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809443	0349
1377-00-115-7451	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809444	0349
1377-00-115-7452	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809445	0349
1377-00-115-7453	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809446	0349
1377-00-115-7454	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809447	0349
1377-00-115-7455	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809448	0349
1377-00-115-7456	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809449	0349
1377-00-115-7457	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809450	0349
1377-00-115-7458	CORD ASSY, DET	1	FB	.0005	1.4S	EX-8809451	0349
1377-00-115-7459	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809452	0349
1377-00-115-7460	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809453	0349
1377-00-115-7461	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809454	0349
1377-00-115-7462	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809455	0349
1377-00-115-7463	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809456	0349
1377-00-115-7464	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809457	0349
1377-00-115-7465	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809458	0349
1377-00-115-7466	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809459	0349
1377-00-115-7467	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809460	0349
1377-00-115-7468	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809461	0349
1377-00-115-7469	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809462	0349
1377-00-115-7470	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809463	0349
1377-00-115-7471	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809464	0349
1377-00-115-7472	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809465	0349
1377-00-115-7473	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809466	0349
1377-00-115-7474	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809467	0349
1377-00-115-7475	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809468	0349
1377-00-115-7476	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809469	0349
1377-00-115-7477	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809470	0349
1377-00-115-7478	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809471	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-115-7479	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809472	0349
1377-00-115-7480	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809473	0349
1377-00-115-7481	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809474	0349
1377-00-115-7482	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809475	0349
1377-00-115-7483	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809476	0349
1377-00-115-7484	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809477	0349
1377-00-115-7485	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809478	0349
1377-00-115-7486	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809479	0349
1377-00-115-7487	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809480	0349
1377-00-115-7488	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809481	0349
1377-00-115-7489	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809482	0349
1377-00-115-7490	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809483	0349
1377-00-115-7491	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809484	0349
1377-00-115-7493	CORD ASSY, DET	1	FB	.0300	1.4S	EX-8809485	0349
1377-00-115-7494	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809486	0349
1377-00-115-7495	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809487	0349
1377-00-115-7496	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809488	0349
1377-00-115-7497	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809489	0349
1377-00-115-7498	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809490	0349
1377-00-115-7499	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809491	0349
1377-00-115-7501	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809493	0349
1377-00-115-7502	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809494	0349
1377-00-115-7503	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809495	0349
1377-00-115-7504	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809496	0349
1377-00-115-9785	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809497	0349
1377-00-115-9786	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809498	0349
1377-00-115-9787	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809499	0349
1377-00-115-9788	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809500	0349
1377-00-115-9789	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809501	0349
1377-00-115-9790	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809502	0349
1377-00-115-9791	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809503	0349
1377-00-115-9792	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809504	0349
1377-00-115-9793	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809505	0349
1377-00-115-9794	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809506	0349
1377-00-115-9795	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809507	0349
1377-00-115-9796	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809508	0349
1377-00-115-9797	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809509	0349
1377-00-115-9798	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809510	0349
1377-00-115-9799	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809511	0349
1377-00-116-4439	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809513	0349
1377-00-117-2792	CTG, IMPULSE, M270	1	WB	.1323	1.4C	EX-8811853	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-117-2795	INITIATOR	20	FB	.0011	1.4C	EX-8805679	0276
1377-00-118-0727	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809514	0349
1377-00-118-0728	CORD ASSY, DET	1	FB	.1650	1.4S	EX-8809515	0349
1377-00-118-0730	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809516	0349
1377-00-118-0731	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809517	0349
1377-00-118-0732	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809518	0349
1377-00-118-0733	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809519	0349
1377-00-118-0734	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809520	0349
1377-00-118-0735	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809521	0349
1377-00-118-0736	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809522	0349
1377-00-118-0737	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809523	0349
1377-00-118-0738	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809524	0349
1377-00-118-0739	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809525	0349
1377-00-118-0740	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809526	0349
1377-00-118-0741	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809527	0349
1377-00-118-0742	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809528	0349
1377-00-118-0743	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809529	0349
1377-00-118-0746	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809530	0349
1377-00-118-0748	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809531	0349
1377-00-118-0760	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809532	0349
1377-00-118-0766	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809533	0349
1377-00-118-0767	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809534	0349
1377-00-118-0768	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809535	0349
1377-00-118-0769	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809536	0349
1377-00-118-0772	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809537	0349
1377-00-118-0773	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809538	0349
1377-00-118-0779	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809539	0349
1377-00-118-0785	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809540	0349
1377-00-118-0791	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809541	0349
1377-00-118-0792	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809542	0349
1377-00-118-0793	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809543	0349
1377-00-118-0794	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809544	0349
1377-00-118-0795	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809545	0349
1377-00-118-0796	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809546	0349
1377-00-118-0797	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809547	0349
1377-00-118-0798	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809548	0349
1377-00-118-0799	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809549	0349
1377-00-118-0801	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809550	0349
1377-00-118-0802	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809551	0349
1377-00-118-0811	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809552	0349
1377-00-119-2022	RKT MTR, MK82 MOD 0	1	FB	.6400	1.3C	EX-8805680	0186

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-119-2033	VERNIER RKT, MK84 MOD 0	1	FB	1.1	1.3C	EX-8809554	0186
1377-00-119-2055	RKT MTR, MK92	1	WB	6.5	1.3C	EX-8805682	0186
1377-00-119-2056	IGNITION ELEMENT MK17 MOD 0	48	FB	.0006	1.4S	EX-8908029	0454
1377-00-119-2061	CTG, IMPULSE MK107 MOD 0	4	MC	.0550	1.4C	EX-8801585	0276
1377-00-119-2706	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809555	0349
1377-00-120-8622	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809556	0349
1377-00-120-8626	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809557	0349
1377-00-120-8627	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809558	0349
1377-00-120-8628	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809559	0349
1377-00-120-8629	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809560	0349
1377-00-120-8630	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809561	0349
1377-00-120-8631	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809562	0349
1377-00-120-8632	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809563	0349
1377-00-120-8633	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809564	0349
1377-00-120-8634	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809565	0349
1377-00-120-8636	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809566	0349
1377-00-120-8637	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809567	0349
1377-00-120-8638	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809568	0349
1377-00-120-8639	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809569	0349
1377-00-120-8640	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809570	0349
1377-00-120-8641	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809571	0349
1377-00-120-8642	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809572	0349
1377-00-120-8643	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809573	0349
1377-00-121-4254	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809574	0349
1377-00-121-4255	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809575	0349
1377-00-121-4256	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809576	0349
1377-00-121-4258	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809577	0349
1377-00-121-4261	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809578	0349
1377-00-121-4262	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809579	0349
1377-00-121-4264	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809580	0349
1377-00-121-4265	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809581	0349
1377-00-121-4266	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809582	0349
1377-00-121-4267	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809583	0349
1377-00-121-4268	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809584	0349
1377-00-121-4269	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809585	0349
1377-00-121-4270	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809586	0349
1377-00-121-4271	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809587	0349
1377-00-121-4273	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809588	0349
1377-00-121-4274	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809589	0349
1377-00-121-4275	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809590	0349
1377-00-121-4276	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809591	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-121-4277	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809592	0349
1377-00-121-4278	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809593	0349
1377-00-121-4286	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809594	0349
1377-00-121-4287	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809595	0349
1377-00-121-4288	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809596	0349
1377-00-121-4289	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809597	0349
1377-00-121-4291	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809598	0349
1377-00-121-4292	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809599	0349
1377-00-121-4293	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809600	0349
1377-00-121-4294	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809601	0349
1377-00-121-4295	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809602	0349
1377-00-121-4299	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809603	0349
1377-00-121-4312	CORD ASSY, DET	1	FB	.0015	1.4S	EX-8809604	0349
1377-00-121-4317	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809605	0349
1377-00-121-4319	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809606	0349
1377-00-121-4320	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809607	0349
1377-00-121-4323	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809608	0349
1377-00-121-4325	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809609	0349
1377-00-121-4326	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809610	0349
1377-00-121-4327	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809611	0349
1377-00-121-4334	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809612	0349
1377-00-121-4335	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809613	0349
1377-00-121-4341	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809615	0349
1377-00-121-4342	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809616	0349
1377-00-121-4343	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809617	0349
1377-00-121-4346	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809618	0349
1377-00-121-4347	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809619	0349
1377-00-121-4350	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809620	0349
1377-00-121-4360	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809621	0349
1377-00-121-4361	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809622	0349
1377-00-121-4365	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809623	0349
1377-00-121-4371	CORD ASSY, DET	1	FB	.0015	1.4S	EX-8809624	0349
1377-00-121-4374	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809625	0349
1377-00-121-4376	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809626	0349
1377-00-121-4377	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809627	0349
1377-00-121-4378	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809628	0349
1377-00-121-4379	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809629	0349
1377-00-123-3905	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809630	0349
1377-00-123-3912	CORD ASSY, DET	1	FB	.1370	1.4S	EX-8809631	0349
1377-00-123-3914	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809632	0349
1377-00-125-0074	ACTUATOR, KIT, DEPLOYMENT	1	FB	.0005	1.4S	EX-8809633	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-125-7777	CATAPULT	1	WB	6.7	1.3C	EX-8809634	0186
1377-00-135-0313	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809635	0349
1377-00-135-0314	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809636	0349
1377-00-135-0315	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809637	0349
1377-00-135-0316	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809638	0349
1377-00-135-0317	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809639	0349
1377-00-135-0318	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809640	0349
1377-00-135-0319	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809641	0349
1377-00-135-0320	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809642	0349
1377-00-135-0321	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809643	0349
1377-00-135-0322	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809644	0349
1377-00-135-0323	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809645	0349
1377-00-135-0324	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809646	0349
1377-00-135-0325	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809647	0349
1377-00-135-0326	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809648	0349
1377-00-135-0327	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809649	0349
1377-00-135-0328	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809650	0349
1377-00-135-0329	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809651	0349
1377-00-135-0330	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809652	0349
1377-00-135-0331	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809653	0349
1377-00-135-0332	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809654	0349
1377-00-135-0333	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809655	0349
1377-00-135-0334	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809656	0349
1377-00-135-0335	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809657	0349
1377-00-135-0336	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809658	0349
1377-00-135-0337	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809659	0349
1377-00-135-0338	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809660	0349
1377-00-135-0339	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809661	0349
1377-00-135-0340	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809662	0349
1377-00-135-0341	CORD ASSY, DET	1	FB	.0015	1.4S	EX-8809663	0349
1377-00-135-0342	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809664	0349
1377-00-135-0343	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809665	0349
1377-00-135-0344	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809666	0349
1377-00-135-0345	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809667	0349
1377-00-135-0346	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809668	0349
1377-00-135-0347	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809669	0349
1377-00-135-0348	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809670	0349
1377-00-135-0349	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809671	0349
1377-00-135-0350	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809672	0349
1377-00-135-0351	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809673	0349
1377-00-135-0352	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809674	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-135-0353	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809675	0349
1377-00-135-0354	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809676	0349
1377-00-135-0355	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809677	0349
1377-00-135-0356	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809678	0349
1377-00-135-0357	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809679	0349
1377-00-135-0358	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809680	0349
1377-00-135-0359	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8809681	0349
1377-00-135-0360	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809682	0349
1377-00-135-0361	INITIATOR	1	FB	.0009	1.4C	EX-8809683	0276
1377-00-135-7890	INITIATOR	1	FB	.0007	1.4C	EX-8809684	0276
1377-00-138-2871	CART REMOVER	*	*	.0302	1.4C	EX-8809685	0276
1377-00-138-3770	INITIATOR	1	FB	.0013	1.4C	EX-8809686	0276
1377-00-139-0956	GUN & CABLE ASSY	1	FB	.0024	1.4S	EX-8809687	0323
1377-00-139-8506	CUTTER, CTG, ACTUATED	1	FB	.0008	1.4S	EX-8805687	0070
1377-00-139-8529	CTG, DELAY	1	FB	.0010	1.4S	EX-8805688	0323
1377-00-140-2651	CTG, ACFT FIRE EXT	1	FB	.0009	1.4S	EX-8809688	0323
1377-00-146-3425	EXTRACTION RKT	1	WB	6.5	1.3C	EX-8809689	0186
1377-00-147-6777	GEN GAS	*	*	.0077	*1.4S	EX-8805690	0012
1377-00-147-6778	INITIATOR	1	FB	.0077	1.4C	EX-8805691	0276
1377-00-152-7155	EXTRACTION RKT	1	WB	6.5	1.3C	EX-8809690	0186
1377-00-159-3275	CATAPULT, ACFT	2	WB	10.0	1.3C	EX-8809691	0186
1377-00-162-7136	CTG, IMPULSE	1	FB	.0439	1.4C	EX-8805694	0276
1377-00-163-6119	CUTTER, CTG, ACTUATED	1	FB	.0002	1.4S	EX-8805695	0070
1377-00-167-8320	EXPL CONTAINER ASSY	1	FB	.0143	1.4S	EX-8809692	0367
1377-00-167-8321	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809693	0349
1377-00-167-8322	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809694	0349
1377-00-167-8324	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809695	0349
1377-00-167-8325	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809696	0349
1377-00-167-8326	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809697	0349
1377-00-167-8327	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809698	0349
1377-00-167-8328	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809699	0349
1377-00-167-8329	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809700	0349
1377-00-167-8330	CORD ASSY, DET	1	FB	.0026	1.4S	EX-8809701	0349
1377-00-167-8333	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809702	0349
1377-00-167-8334	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809703	0349
1377-00-167-8338	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809706	0349
1377-00-167-8339	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809707	0349
1377-00-167-8340	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809708	0349
1377-00-167-8404	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809709	0349
1377-00-167-8405	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809710	0349
1377-00-167-8406	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809711	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-167-8407	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809712	0349
1377-00-167-8408	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809713	0349
1377-00-167-8409	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809714	0349
1377-00-167-8410	CORD ASSY, DET	1	FB	.0017	1.4S	EX-8809715	0349
1377-00-167-8411	CORD ASSY, DET	1	FB	.0017	1.4S	EX-8809716	0349
1377-00-167-8412	CORD ASSY, DET	1	FB	.0017	1.4S	EX-8809717	0349
1377-00-167-8413	CORD ASSY, DET	1	FB	.0017	1.4S	EX-8809718	0349
1377-00-167-8414	CORD ASSY, DET	1	FB	.0016	1.4S	EX-8809719	0349
1377-00-167-8415	CORD ASSY, DET	1	FB	.0016	1.4S	EX-8809720	0349
1377-00-167-8416	CORD ASSY, DET	1	FB	.0020	1.4S	EX-8809721	0349
1377-00-167-8417	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809722	0349
1377-00-167-8418	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809723	0349
1377-00-167-8419	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809724	0349
1377-00-167-8420	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809725	0349
1377-00-167-8421	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809726	0349
1377-00-167-8448	CORD ASSY, DET	1	FB	.0015	1.4S	EX-8809727	0349
1377-00-167-8449	CORD ASSY, DET	1	FB	.0015	1.4S	EX-8809728	0349
1377-00-167-8450	CORD ASSY, DET	1	FB	.0018	1.4S	EX-8809729	0349
1377-00-167-8451	CORD ASSY, DET	1	FB	.0018	1.4S	EX-8809730	0349
1377-00-167-8453	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809731	0349
1377-00-167-8454	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809732	0349
1377-00-169-7187	SEVERANCE ASSY	1	FB	.0047	1.4S	EX-8809733	0367
1377-00-169-7195	SEVERANCE ASSY	1	FB	.0014	1.4S	EX-8809735	0367
1377-00-169-7200	THRUSTER	100	WB	.0004	1.4S	EX-8809736	0173
1377-00-172-0428	CTG, ACFT, FIRE EXT	1	FB	.0009	1.4S	EX-8809737	0323
1377-00-174-5024	CTG, ACFT, FIRE EXT	1	FB	.0009	1.4S	EX-8809738	0323
1377-00-178-9481	BOLT, EXPL	1	FB	.0005	1.4S	EX-8809739	0173
1377-00-182-3020	INITIATOR, JAU-2/A25	1	FB	.0020	1.4C	EX-8805698	0276
1377-00-183-0973	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809740	0349
1377-00-183-0974	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809741	0349
1377-00-183-0975	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809742	0349
1377-00-183-0976	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809743	0349
1377-00-183-0977	CORD ASSY, DET	1	FB	.0007	1.4C	EX-8809744	0349
1377-00-183-0978	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809745	0349
1377-00-183-0979	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809746	0349
1377-00-183-0980	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809747	0349
1377-00-183-0982	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809749	0349
1377-00-183-0983	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809750	0349
1377-00-183-0984	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809751	0349
1377-00-183-0985	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809752	0349
1377-00-183-1086	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809753	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-183-1268	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809754	0349
1377-00-183-1711	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809755	0349
1377-00-183-2357	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809756	0349
1377-00-183-2685	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809757	0349
1377-00-183-2980	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809758	0349
1377-00-183-3995	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809759	0349
1377-00-183-3998	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809760	0349
1377-00-183-3999	CORD ASSY, DET	1	FB	.0014	1.4S	EX-8809761	0349
1377-00-183-4004	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809762	0349
1377-00-183-4006	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809763	0349
1377-00-183-4007	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809764	0349
1377-00-183-4008	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809765	0349
1377-00-183-4009	CORD ASSY, DET	1	FB	.0005	1.4S	EX-8809766	0349
1377-00-183-4013	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809767	0349
1377-00-183-4014	CORD ASSY, DET	1	FB	.0002	1.4S	EX-8809768	0349
1377-00-183-4015	CORD ASSY, DET	1	FB	.0002	1.4S	EX-8809769	0349
1377-00-183-4018	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809770	0349
1377-00-183-4019	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809771	0349
1377-00-183-4237	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809772	0349
1377-00-183-4238	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809773	0349
1377-00-183-4242	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809774	0349
1377-00-183-4243	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809775	0349
1377-00-183-4245	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809776	0349
1377-00-183-4246	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809777	0349
1377-00-183-4247	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809778	0349
1377-00-183-4248	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809779	0349
1377-00-183-4249	CORD ASSY, DET	1	FB	.0018	1.4S	EX-8809780	0349
1377-00-183-4251	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809781	0349
1377-00-183-4257	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809782	0349
1377-00-183-4258	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809783	0349
1377-00-183-4259	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809784	0349
1377-00-183-4260	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809785	0349
1377-00-183-4261	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809786	0349
1377-00-183-4263	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809787	0349
1377-00-183-4265	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809788	0349
1377-00-183-4267	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809789	0349
1377-00-183-4268	CORD ASSY, DET	1	FB	.0047	1.4S	EX-8809790	0349
1377-00-183-5952	CTG, IMPULSE, CCU-1/B	320	MC	.0139	1.4C	EX-8809791	0276
1377-00-188-4086	CTG, ACFT FIRE EXT	1	FB	.0007	1.4S	EX-8809792	0323
1377-00-191-5141	CTG, IMPULSE, CCU-11/B	1	FB	.1726	1.3C	EX-8805699	0275
1377-00-193-4910	CTG, IMPULSE	*	*	.0160	1.4C	EX-8805706	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-193-8832	CTG, IMPULSE, MK124 MOD 0	40	MC	.0189	1.4C	EX-8908013	0276
1377-00-195-2685	ACTIVATOR ASSY	1	FB	.0023	1.4S	EX-8809793	0173
1377-00-201-8838	CATAPULT, ACFT, CKU-2/A	2	WB	6.7	1.3C	EX-8805707	0186
1377-00-219-8567	SQUIB, ELEC	500	WB	.0003	1.4S	EX-8805711	0454
1377-00-222-9062	INITIATOR, M113	1	FB	.0004	1.4C	EX-8805714	0276
1377-00-222-9063	CTG, M36A1	N/A	N/A	N/A	1.4C	EX-8808657	0276
1377-00-236-6903	CTG, DELAY	*	*	.0015	1.4S	EX-8805716	0323
1377-00-238-0552	INITIATOR	1	FB	.0030	1.4C	EX-8805717	0276
1377-00-238-0553	CTG, DELAY	1	FB	.0025	1.4S	EX-8805718	0323
1377-00-238-0554	INITIATOR	1	FB	.0004	1.4C	EX-8805719	0276
1377-00-238-9325	INITIATOR, M104	1	FB	.0040	1.4C	EX-8805720	0276
1377-00-241-1595	GEN ASSY	1	FB	.0400	1.4C	EX-8809797	0276
1377-00-245-7970	CTG, DELAY	1	FB	.0025	1.4S	EX-8805724	0323
1377-00-253-4436	CTG, ASSY	500	WB	.0001	1.4S	EX-8809798	0323
1377-00-255-2554	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8809799	0276
1377-00-260-0253	CTG, IMPULSE	1	FB	.0007	1.4C	EX-8805729	0276
1377-00-260-0279	CTG, IMPULSE	1	FB	.0891	(04)1.2C	EX-8805730	0381
1377-00-261-5361	PARTS KIT, CUTTER	1	FB	.0002	*1.4S	EX-8809800	0012
1377-00-261-5371	CTG, IMPULSE	1	FB	.0013	1.4C	EX-8805731	0276
1377-00-262-1679	CATAPULT, RKT	1	WB	5.5	1.3C	EX-8809801	0186
1377-00-262-1680	REMOVER, RAU-1/A	1	FB	.0800	1.4S	EX-8805732	0323
1377-00-263-4126	INITIATOR	10	FB	.0024	1.4C	EX-8805733	0276
1377-00-269-5031	EXPL KIT	1	FB	.0052	1.4S	EX-8809802	0367
1377-00-280-0272	CTG, ACFT FIRE EXT	1	FB	.0008	1.4S	EX-8809803	0323
1377-00-286-1880	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809804	0349
1377-00-286-1884	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809805	0349
1377-00-286-1886	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809806	0349
1377-00-286-1999	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809807	0349
1377-00-286-2000	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809808	0349
1377-00-286-2001	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809809	0349
1377-00-286-2002	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809810	0349
1377-00-286-2003	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809811	0349
1377-00-286-2004	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809812	0349
1377-00-286-2005	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809813	0349
1377-00-286-2006	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809814	0349
1377-00-286-2014	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809815	0349
1377-00-286-2015	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809816	0349
1377-00-286-2022	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809817	0349
1377-00-286-2023	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809818	0349
1377-00-286-2024	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809819	0349
1377-00-286-2027	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809820	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-286-2028	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809821	0349
1377-00-286-2029	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809822	0349
1377-00-286-2030	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8809823	0349
1377-00-286-2031	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809824	0349
1377-00-286-2032	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809825	0349
1377-00-286-2033	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809826	0349
1377-00-286-2034	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809827	0349
1377-00-286-2035	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809828	0349
1377-00-286-2036	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809829	0349
1377-00-286-2037	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809830	0349
1377-00-288-4985	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809832	0349
1377-00-288-4989	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809833	0349
1377-00-288-4996	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809834	0349
1377-00-288-5015	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809835	0349
1377-00-288-5016	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809836	0349
1377-00-288-5024	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809837	0349
1377-00-288-5047	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809838	0349
1377-00-288-5049	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809839	0349
1377-00-291-8330	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809840	0349
1377-00-291-8332	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809841	0349
1377-00-291-8334	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809842	0349
1377-00-292-8454	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809843	0349
1377-00-292-8456	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809844	0349
1377-00-292-8481	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809845	0349
1377-00-292-8512	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8809846	0349
1377-00-292-8514	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809847	0349
1377-00-292-8516	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809848	0349
1377-00-292-8518	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809849	0349
1377-00-292-8522	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809850	0349
1377-00-292-8524	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809851	0349
1377-00-292-8709	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809852	0349
1377-00-292-8724	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809853	0349
1377-00-292-8725	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809854	0349
1377-00-293-5672	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809855	0349
1377-00-293-5673	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809856	0349
1377-00-293-8183	CTG, IMPULSE, MK1 MOD 3	26	MC	.0631	1.4C	EX-8810224	0276
1377-00-293-8184	CTG, IMPULSE, MK2 MOD 1	52	MC	.0139	1.4C	EX-8805736	0276
1377-00-294-1191	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	EX-8809857	0174
1377-00-294-2508	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8805737	0174
1377-00-294-2509	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8805738	0174
1377-00-294-2510	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8805739	0174

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-295-2179	INITIATOR	1	FB	N/A	1.4C	EX-8809858	0276
1377-00-295-2181	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809859	0349
1377-00-295-2184	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809860	0349
1377-00-295-2206	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809861	0349
1377-00-299-1500	INITIATOR	1	FB	.0005	1.4C	EX-8809862	0276
1377-00-299-1502	CTG IMPULSE	100	WB	.0300	1.4C	EX-8809863	0276
1377-00-299-1506	INITIATOR	1	FB	.0005	1.4C	EX-8809864	0276
1377-00-299-1510	DET CORD	1	FB	.0007	1.4S	EX-8809865	0349
1377-00-299-1511	INITIATOR	1	FB	.0013	1.4C	EX-8809866	0276
1377-00-299-1512	INITIATOR	1	FB	.0007	1.4C	EX-8809867	0276
1377-00-299-1515	INITIATOR	1	FB	.0003	1.4C	EX-8809868	0276
1377-00-299-1516	INITIATOR	1	FB	.0006	1.4C	EX-8809869	0276
1377-00-302-1683	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809870	0349
1377-00-302-1684	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809871	0349
1377-00-302-1685	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809872	0349
1377-00-302-1752	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809874	0349
1377-00-302-1822	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809875	0349
1377-00-302-1829	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809876	0349
1377-00-302-1910	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809877	0349
1377-00-302-1936	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809878	0349
1377-00-302-1968	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809879	0349
1377-00-302-1974	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809880	0349
1377-00-302-1993	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809881	0349
1377-00-302-1994	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809882	0349
1377-00-302-2696	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809883	0349
1377-00-302-2697	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809884	0349
1377-00-302-2700	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809885	0349
1377-00-302-2701	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809886	0349
1377-00-302-2703	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809887	0349
1377-00-302-2706	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809888	0349
1377-00-302-2707	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809889	0349
1377-00-302-2715	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809890	0349
1377-00-302-2716	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809891	0349
1377-00-302-2717	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8809892	0349
1377-00-302-2719	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809893	0349
1377-00-302-2720	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809894	0349
1377-00-302-2721	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809895	0349
1377-00-302-2722	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809896	0349
1377-00-302-2724	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809897	0349
1377-00-303-4296	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809898	0349
1377-00-303-4670	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809899	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-313-4804	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809900	0349
1377-00-313-4834	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809901	0349
1377-00-322-0778	INITIATOR	1	FB	.0005	1.4C	EX-8809902	0276
1377-00-338-6662	CATAPULT, ACFT	1	WB	12.7	1.3C	EX-8809903	0186
1377-00-349-3943	EJECT SEQUENCE SELECTOR	1	FB	.0003	1.4S	EX-8809904	0367
1377-00-349-3950	CTG, IMPULSE	1	FB	.0529	1.4C	EX-8809905	0276
1377-00-349-3957	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809906	0349
1377-00-350-0694	CUTTER, CANOPY	1	FB	.0088	1.1D	EX-8809907	0043
1377-00-350-0698	GEN, GAS PRESSURE	1	FB	.9600	1.4C	EX-8805744	0276
1377-00-351-5503	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8809908	0174
1377-00-351-5508	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8809909	0174
1377-00-351-5512	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8809910	0174
1377-00-351-5531	INITIATOR	1	FB	.0006	1.4C	EX-8809911	0276
1377-00-356-3728	CUTTER, CTG, ACTUATED	*	FB	.0003	1.4S	EX-8809912	0070
1377-00-359-2097	ROTARY ACTUATOR	*	FB	.0155	1.4C	EX-8809913	0276
1377-00-392-2706	CATAPULT, ACFT	1	WB	6.3	1.3C	EX-8809915	0186
1377-00-394-5842	CATAPULT, ACFT	1	WB	6.3	1.3C	EX-8809916	0186
1377-00-399-1492	GUN & CABLE ASSY	1	FB	.0024	1.4S	EX-8809917	0323
1377-00-400-1023	CORD ASSY, DET	1	FB	.0042	1.4D	EX-8809918	0289
1377-00-403-4827	INITIATOR, JAU-8/A25	1	FB	.0040	1.4C	EX-8805747	0276
1377-00-403-5816	CTG, IMPULSE, M31A2	N/A	N/A	.0536	*1.4S	EX-8801887	0014
1377-00-406-9569	CTG, IMPULSE	1	FB	.0020	1.4C	EX-8809919	0276
1377-00-407-9649	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8809920	0276
1377-00-407-9650	EXPL KIT	1	FB	.0066	1.4S	EX-8809921	0367
1377-00-407-9651	EXPL KIT	1	FB	.0039	1.4S	EX-8912077	0367
1377-00-407-9652	CTG, KIT, SHIP	1	FB	.1513	(04)1.2C	EX-8912078	0381
1377-00-407-9653	EXPL KIT	1	FB	.2120	1.4S	EX-8809922	0349
1377-00-408-7468	EXPL KIT	1	FB	.0651	1.4S	EX-8809923	0367
1377-00-408-7469	EXPL KIT	1	FB	.0037	*1.4S	EX-8912088	0012
1377-00-408-7470	EXPL KIT	1	WB	.1567	1.4S	EX-8809924	0367
1377-00-410-0292	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809925	0349
1377-00-410-0876	CTG, DELAY, CCU-4/A	1	FB	.0008	1.4S	EX-8805749	0323
1377-00-411-1363	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809926	0349
1377-00-411-1364	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809927	0349
1377-00-412-3205	CTG, IMPULSE	1	FB	.0010	1.4C	EX-8805750	0276
1377-00-419-6105	CTG, IMPULSE, PPC-13	25	FB	.0006	1.4C	EX-8805751	0276
1377-00-422-0058	VALVE	*	FB	.0003	1.4C	EX-8805752	0173
1377-00-422-1844	INITIATOR	*	FB	.0004	1.4B	EX-8503025	0365
1377-00-422-1845	INITIATOR	*	FB	.0004	1.4B	EX-8503026	0365
1377-00-422-1846	DESTRUCT CHG	*	FB	.1000	1.4D	EX-8805753	0104
1377-00-422-1847	DESTRUCT CHG	*	FB	.0600	1.4D	EX-8805754	0104

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-424-7403	CTG, KIT, BOMB	100	WB	.0003	1.4S	EX-8809928	0323
1377-00-426-0253	CATAPULT	1	WB	6.3	1.3C	EX-8809929	0186
1377-00-430-4579	COVER ASSY	1	FB	.0033	1.4S	EX-8809930	0367
1377-00-433-2324	INITIATOR, JAU-3/A25	1	FB	.0040	1.4C	EX-8805755	0276
1377-00-435-1405	CATAPULT, ACFT	1	WB	10.0	1.3C	EX-8805757	0186
1377-00-437-7226	THRUSTER, M26	1	FB	.0003	1.4S	EX-8809931	0323
1377-00-438-9693	GEN ASSY	1	FB	.0120	1.4C	EX-8912136	0276
1377-00-438-9694	GEN ASSY	1	FB	.0340	1.4C	EX-8809932	0276
1377-00-446-7014	CTG, IMPULSE	1	FB	.0140	1.4C	EX-8805759	0276
1377-00-448-8898	INITIATOR	1	FB	.0004	1.4C	EX-8805761	0276
1377-00-450-0697	BOLT, EXPL	1	FB	.0005	1.4S	EX-8805762	0173
1377-00-453-5947	CTG, DELAY, MK136 MOD 0	4	MC	.0003	1.4S	EX-8805763	0323
1377-00-453-5948	CTG, DELAY, MK142 MOD 0	2	MC	.0040	1.4S	EX-8805764	0323
1377-00-453-5949	CTG, DELAY, MK141 MOD 0	2	MC	.0009	1.4S	EX-8805765	0323
1377-00-455-7852	CATAPULT, ACFT	1	WB	10.0	1.3C	EX-8805766	0186
1377-00-460-1301	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809934	0349
1377-00-460-1302	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8809935	0349
1377-00-463-1692	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8809936	0349
1377-00-463-1693	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809937	0349
1377-00-463-1699	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809938	0349
1377-00-465-9584	CONNECTOR/MANIFOLD ASSY	1	FB	.0670	1.4S	EX-8809939	0349
1377-00-465-9586	CONNECTOR/MANIFOLD ASSY	1	FB	.0007	1.4S	EX-8809940	0349
1377-00-466-1808	CTG, IMPULSE, MK51 MOD 1	4	MC	.0042	1.4C	EX-8908018	0276
1377-00-469-8513	BOLT, EXPL	*	FB	.0010	1.4S	EX-8809941	0173
1377-00-469-8518	REEL ASSY	1	FB	.0022	1.4S	EX-8809942	0323
1377-00-470-2977	INITIATOR, JAU-9/A25	1	FB	.0040	1.4C	EX-8805768	0276
1377-00-470-3951	CORD ASSY, DET	1	FB	.0430	1.4D	EX-8809943	0289
1377-00-470-3994	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809944	0349
1377-00-470-3995	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8809945	0349
1377-00-470-3996	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809946	0349
1377-00-470-3997	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809947	0349
1377-00-470-3998	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8809948	0349
1377-00-470-9086	GUN & CABLE ASSY	1	FB	.0022	1.4S	EX-8809949	0323
1377-00-471-9660	CTG, IMPULSE	1	FB	.0026	1.4C	EX-8805769	0276
1377-00-471-9661	CTG, IMPULSE	1	FB	.0622	1.4C	EX-8805770	0276
1377-00-480-2718	CTG, FASTENER	*	*	N/A	1.4S	EX-8805771	0174
1377-00-481-7080	EXPL KIT	1	WB	.1567	1.4S	EX-8809950	0367
1377-00-481-7081	EXPL KIT	1	WB	.1869	1.4S	EX-8809951	0349
1377-00-483-3046	CUTTER, CANOPY	1	FB	.0003	1.1D	EX-8809952	0043
1377-00-485-3930	GEN ASSY	1	FB	.0177	1.4C	EX-8809953	0276
1377-00-486-6225	SEVERANCE ASSY	1	FB	.0079	1.4S	EX-8809954	0367

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-486-6226	SEVERANCE ASSY	1	FB	.0079	1.4S	EX-8809955	0367
1377-00-486-8619	CTG, IMPULSE, MK51 MOD 1	7	MC	.0042	1.4C	EX-8805772	0276
1377-00-488-6868	CTG, POWDER ACTUATED	*	*	.0025	1.4S	EX-8805773	0174
1377-00-488-6869	CTG, POWDER ACTUATED	*	*	.0046	1.4S	EX-8809956	0174
1377-00-488-6870	CTG, POWDER ACTUATED	*	*	.0042	1.4S	EX-8805774	0174
1377-00-488-6871	CTG, POWDER ACTUATED	*	*	.0056	1.4S	EX-8805775	0174
1377-00-489-1527	CUTTER, CTG, ACTUATED	*	*	.0082	1.4S	EX-8809957	0070
1377-00-489-1549	GAS CONTAINER	1	FB	.0002	1.4S	EX-8809958	0349
1377-00-489-7476	INITIATOR, DELAY	1	FB	.0022	1.4C	EX-8809959	0276
1377-00-489-9460	INITIATOR	1	FB	.0012	1.4C	EX-8809960	0276
1377-00-490-6251	CTG, IMPULSE	1	FB	.0040	1.4C	EX-8805776	0276
1377-00-491-6192	SQUIB ELECT, BBU-52/B	468	FB	.0015	1.4S	EX-8809961	0454
1377-00-492-4852	CTG, IMPULSE	100	FB	.0005	1.4C	EX-8809962	0276
1377-00-492-7145	CATAPULT, ACFT	2	WB	10.0	1.3C	EX-8805777	0186
1377-00-492-9668	CATAPULT, ACFT	2	WB	10.0	1.3C	EX-8805778	0186
1377-00-496-9188	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8809963	0174
1377-00-500-6877	GUN & CABLE ASSY	1	FB	.0037	1.4S	EX-8809964	0323
1377-00-512-2857	CTG, CCU-42/A	4	MC	.0002	1.4S	EX-8809965	0349
1377-00-516-9924	CTG, IMPULSE, ARD446-1	4	MC	.0276	1.4C	EX-8809966	0276
1377-00-518-6515	CATAPULT	1	WB	6.3	1.3C	EX-8805780	0186
1377-00-528-5241	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	EX-8805781	0174
1377-00-528-5351	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8805782	0174
1377-00-528-5406	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	EX-8805784	0174
1377-00-528-5415	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	EX-8805785	0174
1377-00-528-5453	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8805786	0174
1377-00-528-5454	CTG, POWDER ACTUATED	2000	FB	N/A	1.4S	EX-8805787	0174
1377-00-528-5456	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8805788	0174
1377-00-529-9301	SQUIB, ELEC, S75	500	WB	.0020	1.4S	EX-8805790	0454
1377-00-531-8659	CTG, IMPULSE	1	FB	.0003	1.4C	EX-8912137	0276
1377-00-534-2715	CATAPULT	1	WB	6.3	1.3C	EX-8805791	0186
1377-00-534-2725	CATAPULT	2	WB	10.0	1.3C	EX-8809968	0186
1377-00-534-2733	CATAPULT	2	WB	10.0	1.3C	EX-8809969	0186
1377-00-534-2728	CATAPULT	2	WB	10.0	1.3C		0186
1377-00-540-4813	CTG, IMPULSE, M37	100	FB	.1600	1.4C	EX-8805792	0276
1377-00-540-9524	CTG, IMPULSE, M73	100	FB	.0100	1.4C	EX-8809970	0276
1377-00-542-0294	INITIATOR, M6A1	20	FB	.0080	1.4C	EX-8805794	0276
1377-00-554-3103	THRUSTER, M25A1	4	FB	.0130	1.4S	EX-8805795	0323
1377-00-554-6647	CTG, IMPULSE, M43	200	FB	.0160	1.4C	EX-8805796	0276
1377-00-554-6649	CTG, M46	100	FB	.0080	1.4C	EX-8809971	0276
1377-00-559-9518	CTG, DELAY, MK86 MOD 0	1	FB	.0040	1.4S	EX-8805798	0323
1377-00-575-8945	SEVERANCE ASSY	1	FB	.0014	1.4S	EX-8809973	0367

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-580-5849	CTG, DELAY, M93	400	FB	.0120	1.4C	EX-8805800	0276
1377-00-581-0612	PRIMER, INITIATOR	*	FB	.0001	1.4B	EX-8503027	0365
1377-00-581-0614	CABLE CUTTER	*	FB	.0011	1.4S	EX-8809974	0070
1377-00-581-0625	CABLE CUTTER	*	FB	.0003	1.4S	EX-8809975	0070
1377-00-581-0626	CATAPULT	1	WB	10.0	1.3C	EX-8805801	0186
1377-00-581-0628	CATAPULT	1	WB	10.0	1.3C	EX-8805802	0186
1377-00-581-0629	CATAPULT, RKT	1	WB	10.0	1.3C	EX-8809976	0186
1377-00-585-9291	CTG, IMPULSE, ARD863-1	8	MC	.0090	1.4C	EX-8907073	0276
1377-00-596-9673	SQUIB, FIRE EXT	1	FB	.0002	1.4S	EX-8809977	0454
1377-00-607-0306	REMOVER, M4	1	FB	.0222	1.4S	EX-8805805	0323
1377-00-607-0314	THRUSTER, M15	1	FB	.0300	1.4S	EX-8805807	0323
1377-00-607-0316	THRUSTER, M5A2	4	FB	.0100	1.4S	EX-8805808	0323
1377-00-607-6052	FIRING MECHANISM	1	FB	.0309	1.4S	EX-8809978	0323
1377-00-613-0378	CTG, DELAY	1	MC	.0003	1.4S	EX-8809979	0323
1377-00-613-0468	CATAPULT	1	WB	6.3	1.3C	EX-8809980	0186
1377-00-628-0276	FIRING MECHANISM	1	FB	.0265	1.4S	EX-8809981	0323
1377-00-628-5178	CATAPULT, ACFT, M3A1	1	FB	.4500	1.4C	EX-8805810	0276
1377-00-628-5179	CATAPULT, ACFT, M4A1	1	FB	.1600	1.4C	EX-8805811	0276
1377-00-628-5180	REMOVER, M1A3	1	FB	.0500	1.4S	EX-8805812	0323
1377-00-628-5181	REMOVER, M3A1	1	FB	.0536	1.4S	EX-8805813	0323
1377-00-630-9597	CTG, ACTUATOR, MK24 MOD 0	*	FB	.0003	1.4C	EX-8805814	0276
1377-00-632-8714	CTG, IMPULSE, MK23 MOD 0	4	MC	.0002	1.4S	EX-8805815	0070
1377-00-658-3059	CTG, IMPULSE, MK14 MOD 0	1	MC	.0210	1.4C	EX-8908012	0276
1377-00-677-6281	SQUIB, ELEC	1	FB	.0007	1.4S	EX-8805817	0454
1377-00-684-1876	CTG, IMPULSE, M119	300	FB	.0070	1.4C	EX-8809982	0276
1377-00-684-3313	CTG, IMPULSE, M91	300	FB	.0050	1.4C	EX-8810223	0276
1377-00-686-2266	SQUIB ASSY, ELEC	1	FB	.0001	1.4S	EX-8809983	0454
1377-00-720-2486	CTG, POWDER ACTUATED	*	*	.0177	1.4S	EX-8805823	0174
1377-00-720-2488	CTG, POWDER ACTUATED	*	*	N/A	1.4S	EX-8805824	0174
1377-00-720-3595	THRUSTER, M11	1	FB	.0014	1.4S	EX-8810219	0323
1377-00-723-3425	CTG, ENG STARTER, MXU-4/A	96	WB	8.0	1.4C	EX-8805825	0276
1377-00-724-9886	INITIATOR, M28	20	FB	.0050	1.4C	EX-8805827	0276
1377-00-725-7760	CTG, IMPULSE, M44A1	300	FB	.0080	1.4C	EX-8805828	0276
1377-00-729-4635	CTG, DELAY, M150	*	*	.0120	1.4C	EX-8805830	0276
1377-00-729-4638	CTG, DELAY, M70	300	FB	.0120	1.4C	EX-8805831	0276
1377-00-731-4496	CTG, DELAY, MK36 MOD 0	4	MC	.0004	*1.4S	EX-8809984	0012
1377-00-731-9264	CTG, IMPULSE, MK9 MOD 0	10	MC	.0187	1.4C	EX-8908016	0276
1377-00-731-9271	INITIATOR, M99	20	FB	.0050	1.4C	EX-8805836	0276
1377-00-731-9272	INITIATOR, M53	20	FB	.0500	1.4C	EX-8805837	0276
1377-00-735-8157	CTG, IMPULSE, M146	300	FB	.0010	1.4C	EX-8805839	0276
1377-00-741-9125	CTG, IMPULSE	1	FB	.0005	1.4C	EX-8805840	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-752-8421	REMOVER, M9	1	WB	.0919	1.3C	EX-8805841	0275
1377-00-753-2009	INITIATOR, M32	20	WB	.0110	1.4C	EX-8805842	0276
1377-00-753-2010	THRUSTER, M9	4	FB	.0070	1.4S	EX-8805843	0323
1377-00-756-0995	CTG, IMPULSE, M94	300	FB	.0300	1.4C	EX-8805846	0276
1377-00-756-1384	CTG, ACFT, FIRE EXT	1	FB	.0009	1.4S	EX-8805847	0323
1377-00-756-1668	CTG, DELAY, M90	400	FB	.0080	1.4C	EX-8805848	0276
1377-00-756-1669	CTG, DELAY, M114	25	FB	.0080	1.4S	EX-8805849	0323
1377-00-756-3498	CTG, IMPULSE, M141	300	FB	.0010	1.4C	EX-8805850	0276
1377-00-756-3499	INITIATOR, M31	20	FB	.0110	1.4C	EX-8805851	0276
1377-00-756-3501	THRUSTER, M13	4	FB	.0070	1.4S	EX-8810222	0323
1377-00-758-3781	GEN, GAS PRESSURE	1	MB	.0008	1.3C	EX-8805852	0275
1377-00-761-2645	CATAPULT, ACFT	1	WP	6.5	1.3C	EX-8809985	0186
1377-00-774-7263	INITIATOR, M110	1	FB	.0040	1.4C	EX-8805855	0276
1377-00-781-8967	INITIATOR	1	FB	.0009	1.4C	EX-8809986	0276
1377-00-782-9862	INITIATOR ASSY	1	FB	.0006	1.4S	EX-8809987	0367
1377-00-782-9863	COVER ASSY	1	FB	.0066	1.4S	EX-8809988	0367
1377-00-782-9864	SEVERANCE ASSY	1	FB	.0100	1.4S	EX-8809989	0367
1377-00-790-9686	EXPL KIT, MLU-5/B	96	WB	.0105	1.4S	EX-8809990	0367
1377-00-793-9926	CTG, IMPULSE, MK19 MOD 0	96	MC	.0031	1.4C	EX-8908007	0276
1377-00-796-6227	CAPSULE, POWDER, BOOST	1000	WB	.0004	1.3C	EX-8809991	0161
1377-00-797-0710	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8809992	0276
1377-00-802-0293	CTG, IMPULSE, M42A1	300	FB	.0070	1.4C	EX-8805863	0276
1377-00-804-4631	INITIATOR	1	FB	.0003	1.4C	EX-8809993	0276
1377-00-804-4643	INITIATOR	1	FB	.0009	1.4C	EX-8809994	0276
1377-00-809-0868	GEN, GAS PRESSURE	1	FB	.0220	1.4C	EX-8809995	0276
1377-00-809-2959	INITIATOR	1	FB	.0010	1.4C	EX-8809996	0276
1377-00-824-2916	SQUIB, ELEC	1	FB	.0002	1.4S	EX-8805865	0454
1377-00-825-4910	INITIATOR	1	FB	.0030	1.4C	EX-8805867	0276
1377-00-825-4911	CTG, DELAY	1	FB	.0025	1.4S	EX-8809997	0323
1377-00-831-3411	CUTTER, CTG, ACTUATED, M8	1	FB	.0129	1.4S	EX-8908028	0070
1377-00-845-1058	INITIATOR, M26	20	FB	.0080	1.4C	EX-8805868	0276
1377-00-845-1059	INITIATOR, M27	20	FB	.0050	1.4C	EX-8810220	0276
1377-00-845-5242	CTG SET SEAT	1	MC	.0250	1.4S	EX-8805869	0323
1377-00-849-0214	THRUSTER, M16	4	FB	.0010	1.4S	EX-8805870	0323
1377-00-850-2089	CTG, IMPULSE	1	FB	.0011	*1.4S	EX-8809999	0012
1377-00-850-2091	COVER ASSY	1	FB	.0070	1.4S	EX-8808095	0367
1377-00-850-8521	CTG, GUILLOTINE	1	FB	.0031	1.4C	EX-8808096	0276
1377-00-850-8522	CTG, GUILLOTINE	1	FB	.0001	1.4C	EX-8808097	0276
1377-00-850-8527	CTG, IMPULSE	1	FB	.0031	1.4C	EX-8808098	0276
1377-00-857-9305	RKT MTR	1	WB	117.0	1.3C	EX-8808100	0186
1377-00-859-9668	BOLT, EXPL	1	FB	1.0	1.4S	EX-8808101	0173

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-863-9387	CTG, ENG STARTER, MXU-4A/A	96	WB	8.0	1.4C	EX-8805872	0276
1377-00-864-3226	REMOVER, M8A1	1	WB	.0345	1.4S	EX-8808102	0323
1377-00-870-9296	CTG, KIT, BOMB EJECTION, MLU-12C	2	FB	.0019	1.1B		0030
1377-00-872-4141	GEN, GAS PRESSURE	1	MB	30.5	1.3C	EX-8808103	0275
1377-00-872-4142	GEN, GAS PRESSURE	1	MB	41.0	1.3C	EX-8808104	0275
1377-00-883-8991	RKT MTR, MK51 MOD 0	1	WB	6.5	1.3C	EX-8805875	0186
1377-00-883-8997	CTG, IMPULSE	2	MC	.0140	1.4C	EX-8805876	0276
1377-00-883-8998	CTG, IMPULSE	2	MC	.0030	1.4C	EX-8805877	0276
1377-00-885-3989	INITIATOR, MK11 MOD 0	1	FB	.0004	1.4C	EX-8805878	0276
1377-00-891-5488	THRUSTER, M1A2	4	FB	.0070	1.4S	EX-8805879	0323
1377-00-891-6310	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8808106	0276
1377-00-891-6312	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8808107	0276
1377-00-891-6313	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8808108	0276
1377-00-891-6315	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8808109	0276
1377-00-891-6318	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8808110	0276
1377-00-891-6319	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8808111	0276
1377-00-891-9573	BOOSTER, FITTING	1	FB	.0003	1.4S	EX-8808112	0367
1377-00-891-9574	BOOSTER, FITTING	1	FB	.0003	1.4S	EX-8808113	0367
1377-00-899-8874	INITIATOR, M5A2	20	FB	.0090	1.4C	EX-8805880	0276
1377-00-903-3274	INITIATOR	1	FB	.0007	1.4C	EX-8805881	0276
1377-00-917-1421	CORD ASSY, DET	1	FB	.0002	1.4S	EX-8808114	0349
1377-00-917-8542	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8808116	0349
1377-00-917-8543	CORD ASSY, DET	1	FB	.0019	1.4S	EX-8808117	0349
1377-00-917-8557	CORD ASSY, DET	1	FB	.0024	1.4S	EX-8808118	0349
1377-00-918-7200	CORD ASSY, DET	1	FB	.0016	1.4S	EX-8808120	0349
1377-00-918-7488	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8808122	0349
1377-00-918-8533	SQUIB ASSY, ELEC	1	FB	.0007	1.4S	EX-8808124	0454
1377-00-919-5790	CORD ASSY, DET	1	FB	.0015	1.4S	EX-8808126	0349
1377-00-919-5791	CORD ASSY, DET	1	FB	.0015	1.4S	EX-8808127	0349
1377-00-920-1588	CORD ASSY, DET	1	FB	.0019	1.4S	EX-8808129	0349
1377-00-920-7347	EXPL CUTTER	1	FB	.0054	1.4S	EX-8808130	0367
1377-00-921-5048	THRUSTER, M2A2	8	FB	.0160	1.4S	EX-8808131	0323
1377-00-922-4207	SWITCH, SQUIB ACT	1	FB	.0003	1.4S	EX-8808132	0349
1377-00-924-8892	CHG ASSY, ANTENNA	1	MB	.0061	1.4S	EX-8808133	0367
1377-00-925-3148	INITIATOR	1	MB	.0004	1.4C	EX-8808134	0276
1377-00-925-5639	REMOVER	1	WB	.0177	1.4S	EX-8808135	0323
1377-00-925-8553	SQUIB, ELEC	1	FB	.0001	1.4S	EX-8805883	0454
1377-00-926-9412	INITIATOR, M30A1	20	FB	.0110	1.4C	EX-8808136	0276
1377-00-926-9413	INITIATOR, M32	20	FB	.0110	1.4C	EX-8808137	0276
1377-00-926-9414	INITIATOR, M45A1	20	FB	1.0	1.4C	EX-8810221	0276
1377-00-926-9415	INITIATOR, M49A1	20	FB	1.0	1.4C	EX-8805884	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-00-931-9311	CORD ASSY, DET	1	FB	.0016	1.4S	EX-8808138	0349
1377-00-931-9339	CORD ASSY, DET	1	FB	.0002	1.4S	EX-8808140	0349
1377-00-931-9345	CORD ASSY, DET	1	FB	.0002	1.4S	EX-8808141	0349
1377-00-931-9346	CORD ASSY, DET	1	FB	.0013	1.4S	EX-8808142	0349
1377-00-931-9347	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808143	0349
1377-00-932-5031	INITIATOR, M3A2	20	FB	.0009	1.4C	EX-8808144	0276
1377-00-935-9223	CATAPULT, ACFT, M37	1	FB	6.0	1.3C	EX-8805887	0186
1377-00-940-1940	REMOVER	1	FB	11.9	(04)1.2G	EX-8808145	0314
1377-00-943-6123	EXPL CUTTER	2	FB	.0020	1.4S	EX-8808146	0367
1377-00-944-1833	CUTTER, CTG, ACT	*	FB	.0013	1.4S	EX-8805888	0070
1377-00-953-5567	THRUSTER, M3A3	4	FB	.0080	1.4S	EX-8808147	0323
1377-00-956-5399	CTG, GAS GEN	1	MB	5.3	1.3C	EX-8808148	0275
1377-00-958-1048	CTG, RELEASE	2000	WB	.0006	1.4S	EX-8805891	0323
1377-00-962-6488	GEN, GAS PRESSURE	1	MB	4.9	1.3C	EX-8805893	0275
1377-00-962-8626	CTG, DELAY, MK86 MOD 0	1	FB	.0040	*1.4S	EX-8805894	0012
1377-00-962-8695	ACTUATOR ASSY	1	FB	.0154	1.4C	EX-8808149	0276
1377-00-966-5399	PARA KIT, MLU-14/B	4	WB	.1520	1.4S	EX-8808150	0323
1377-00-967-5163	CTG, GAS GEN	1	MB	5.3	1.3C	EX-8808151	0275
1377-00-967-5164	GEN, GAS PRESSURE	1	MB	4.9	1.3C	EX-8808152	0275
1377-00-970-5959	SEVERANCE ASSY	1	FB	.0057	1.4S	EX-8808153	0367
1377-00-970-5961	EXPL CHG	1	FB	.0147	1.4S	EX-8808154	0367
1377-00-971-6411	INITIATOR	1	FB	.0059	1.4C	EX-8808155	0276
1377-00-971-7101	SEVERANCE ASSY	1	FB	.0149	1.4S	EX-8808156	0367
1377-00-972-0353	COVER ASSY	1	FB	.0121	1.4S	EX-8808157	0367
1377-00-978-7644	CUTTER, CTG, ACT	1	FB	.0002	1.4S	EX-8808158	0070
1377-00-980-7360	MANIFOLD ASSY	1	FB	.0004	1.4B	EX-8808159	0257
1377-00-980-7375	MANIFOLD ASSY	1	FB	.0004	1.4B	EX-8808160	0257
1377-00-984-1604	CTG, IMPULSE	100	WB	.0089	1.4C	EX-8805897	0276
1377-00-984-6280	CTG, IMPULSE, MK67 MOD 0	2	MC	.0189	1.4C	EX-8908020	0276
1377-00-987-3603	CTG, IMPULSE, MK44 MOD 0	*	FB	.0001	1.4C	EX-8805901	0276
1377-00-988-1872	CTG, ENG STARTER, MXU-129/A	144	WB	4.0	1.3C	EX-8805902	0275
1377-00-988-1873	CATAPULT, ACFT, M9	1	WB	6.0	1.3C	EX-8711051	0186

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-00-989-8159	CONNECTOR/MANIFOLD ASSY	1	FB	.1006	1.4S	EX-8808161	0349
1377-00-989-8279	CONNECTOR/MANIFOLD ASSY	1	FB	.0007	1.4S	EX-8808162	0349
1377-00-994-0011	TRANSFER ASSY	1	FB	.0008	1.4B	EX-8808163	0257
1377-00-996-5722	CTG, IMPULSE	1	MB	.0992	1.3C	EX-8808164	0275
1377-00-997-9241	INITIATOR, BAROSTAT, LOCK	1	FB	.0013	1.4C	EX-8808165	0276
1377-01-003-1175	PARTS KIT, EGRESS	1	WB	.0630	1.4S	EX-8808166	0367
1377-01-003-1206	CUTTER	*	*	.0039	1.4S	EX-8808167	0070
1377-01-003-6616	RKT MTR, MK51 MOD 1	1	WB	6.5	1.3C	EX-8808168	0186
1377-01-005-2253	CUTTER, REEFING LINE	*	*	.0003	1.4S	EX-8808169	0070
1377-01-005-8621	CUTTER, REEFING LINE	*	*	.0026	1.4S	EX-8808170	0070
1377-01-007-4176	CTG, MK164 MOD 0	1	FB	.0420	1.4S	EX-8808171	0349
1377-01-007-4740	CATAPULT	1	WB	10.0	1.3C	EX-8808172	0186
1377-01-007-4741	CATAPULT	1	WB	10.0	1.3C	EX-8808173	0186
1377-01-007-4742	CATAPULT	1	WB	10.0	1.3C	EX-8808174	0186
1377-01-007-8383	CATAPULT, M31A1	1	WB	10.0	1.3C	EX-8808175	0186
1377-01-011-6343	CATAPULT, RKT	2	WB	12.7	1.3C	EX-8808176	0186
1377-01-013-9250	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808177	0349
1377-01-014-2401	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808178	0349
1377-01-014-2402	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808179	0349
1377-01-014-2404	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808180	0349
1377-01-014-2405	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8808181	0349
1377-01-014-2406	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8808182	0349
1377-01-014-2407	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8908070	0349
1377-01-015-1802	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8808183	0349
1377-01-015-1803	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808184	0349
1377-01-015-6422	DROGUE, GUN	1	FB	.0006	1.4S	EX-8808185	0323
1377-01-015-6490	CATAPULT, RKT	2	WB	10	1.3C	EX-8808186	0186
1377-01-015-9055	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808187	0349
1377-01-015-9056	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808188	0349
1377-01-015-9057	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808189	0349
1377-01-015-9058	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808190	0349
1377-01-015-9059	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808191	0349
1377-01-015-9060	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808192	0349
1377-01-015-9061	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808193	0349
1377-01-015-9062	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808194	0349
1377-01-015-9063	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808195	0349
1377-01-015-9064	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808196	0349
1377-01-015-9065	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808197	0349
1377-01-015-9066	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808198	0349
1377-01-015-9067	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808199	0349
1377-01-015-9068	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808200	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-015-9069	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808201	0349
1377-01-015-9070	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808202	0349
1377-01-015-9071	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808203	0349
1377-01-015-9072	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808204	0349
1377-01-015-9073	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808205	0349
1377-01-015-9074	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8908067	0349
1377-01-015-9075	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808206	0349
1377-01-015-9076	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808207	0349
1377-01-015-9077	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808208	0349
1377-01-016-1415	CTG	*	*	N/A	1.4S	EX-8808209	0174
1377-01-016-1416	CTG	*	*	N/A	1.4S	EX-8808210	0174
1377-01-016-3203	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8908066	0349
1377-01-016-3204	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808211	0349
1377-01-016-3205	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808212	0349
1377-01-016-3206	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808213	0349
1377-01-016-3207	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8908065	0349
1377-01-016-3208	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8808214	0349
1377-01-016-3209	CORD ASSY, DET	1	FB	.0011	1.4S	EX-8808215	0349
1377-01-016-3210	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808216	0349
1377-01-016-3211	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808217	0349
1377-01-016-3212	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808218	0349
1377-01-016-3213	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808219	0349
1377-01-016-3214	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808220	0349
1377-01-016-3215	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808221	0349
1377-01-016-3216	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808222	0349
1377-01-016-3217	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808223	0349
1377-01-016-3218	CORD ASSY, DET	1	FB	.0012	1.4S	EX-8808224	0349
1377-01-016-3219	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808225	0349
1377-01-016-3221	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808226	0349
1377-01-016-3222	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808227	0349
1377-01-016-4161	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808228	0349
1377-01-016-4612	CTG	*	*	N/A	1.4S	EX-8808229	0174
1377-01-016-6724	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808230	0349
1377-01-017-0601	INITIATOR, CTG, ACT	1	FB	.0003	1.4C	EX-8808231	0276
1377-01-017-0602	INITIATOR, CTG ACT	1	FB	.0004	1.4C	EX-8808232	0276
1377-01-017-0612	CTG, DELAY, 0.30-SEC	1	FB	.0025	1.4S	EX-8808233	0323
1377-01-017-0613	CTG, DELAY, 0.40-SEC	1	FB	.0025	1.4S	EX-8808234	0323
1377-01-017-4040	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808235	0349
1377-01-017-4524	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808236	0349
1377-01-017-4525	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808237	0349
1377-01-017-4526	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808238	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-017-4527	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808239	0349
1377-01-017-4528	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808240	0349
1377-01-017-4529	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808241	0349
1377-01-017-4530	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808242	0349
1377-01-017-4531	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	EX-8808243	0349
1377-01-017-4532	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808244	0349
1377-01-017-4533	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808245	0349
1377-01-017-4534	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808246	0349
1377-01-017-4535	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808247	0349
1377-01-017-4536	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808248	0349
1377-01-017-4537	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808249	0349
1377-01-017-4538	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808250	0349
1377-01-017-4539	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808251	0349
1377-01-017-4540	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8808252	0349
1377-01-018-2110	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8808253	0349
1377-01-018-2111	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808254	0349
1377-01-018-8721	SHIELDED MILD DET CORD	1	FB	.0010	1.4S	EX-8808255	0349
1377-01-020-0519	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	EX-8808256	0349
1377-01-020-0520	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	EX-8808257	0349
1377-01-020-0521	SHIELDED MILD DET CORD	1	FB	.0009	1.4S	EX-8808258	0349
1377-01-021-9574	CATAPULT, RKT	2	WB	12.7	1.3C	EX-8808259	0186
1377-01-027-0137	CORD ASSY, DET	3	FB	.0006	1.4S	EX-8808260	0349
1377-01-029-7385	CATAPULT, RKT	1	WB	10.0	1.3C	EX-8808261	0186
1377-01-029-7386	CATAPULT, RKT	2	WB	10.0	1.3C	EX-8808262	0186
1377-01-030-3828	INITIATOR, CTG, ACT	*	FB	.0077	1.4C	EX-8808263	0276
1377-01-031-4938	CUTTER, REEFING LINE	*	*	.0039	1.4S	EX-8808264	0349
1377-01-031-9084	CORD ASSY, DET	3	FB	.0006	1.4S	EX-8808265	0349
1377-01-033-0269	INITIATOR, PROPELLANT ACT, JAU-16/A25	1	FB	.8000	1.4C	EX-8808266	0276
1377-01-033-3361	SHIELDED MILD DET CORD	1	FB	.0008	1.4S	EX-8808267	0349
1377-01-034-9804	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808268	0349
1377-01-036-6598	RKT, DIVERGENCE	2	WB	.6400	1.3C	EX-8808269	0186
1377-01-036-8514	RKT MTR, MK92	1	WB	6.5	1.3C	EX-8801953	0186
1377-01-037-8538BT	CTG FIRE EXT	1	FB	.0007	1.4S	EX-8808658	0454
1377-01-037-8572	CORD ASSY, DET	3	FB	.0007	1.4S	EX-8808272	0349
1377-01-037-8573	CORD ASSY, DET	3	FB	.0007	1.4S	EX-8808273	0349
1377-01-037-8650	CTG, IMPULSE, BBU-36/B	2160	FB	.0022	1.4S	EX-8808274	0454
1377-01-037-8651	CTG, IMPULSE, BBU-35/B	240	FB	.0008	1.4S	EX-8808275	0454
1377-01-038-7209	GAS GEN, MK7 MOD 1	*	*	.7717	1.4C	EX-8808277	0276
1377-01-043-8275	CTG FIRE EXT	*	*	.0009	1.4S	EX-8808279	0323
1377-01-044-6367	FIRE EXT, CART	1	FB	.0007	1.4S	EX-8808280	0454
1377-01-045-7095	CATAPULT, RKT	2	WB	12.7	1.3C	EX-8808281	0186

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-046-7782	INITIATOR, PRESSURE BOOST	1	FB	.0066	1.4C	EX-8808282	0276
1377-01-046-7783	INITIATOR, PRESSURE BOOST	1	FB	.0100	1.4C	EX-8808283	0276
1377-01-047-3523	INITIATOR, SEAT, 0.75-SEC	1	FB	.0066	1.4C	EX-8808284	0276
1377-01-047-7458	INITIATOR, TRIGGER	1	FB	.0066	1.4C	EX-8808285	0276
1377-01-048-6903	CABLE CUTTERS	*	*	.0052	1.4S	EX-8808286	0070
1377-01-048-6904	CABLE CUTTERS	*	*	.0051	1.4S	EX-8808287	0070
1377-01-048-9844	RELEASE BOLT	1	FB	.0012	1.4S	EX-8808288	0173
1377-01-049-6365	CTG, IMPULSE, M796	2160	FB	.0008	1.4S	EX-8808290	0454
1377-01-049-7586	ACTUATOR ASSY, ROTARY	1	FB	.0154	1.4C	EX-8808291	0276
1377-01-050-2799	CABLE CUTTERS	*	*	.0078	1.4S	EX-8808292	0070
1377-01-052-6799	OUTPUT LINE ASSY	1	FB	.0025	1.4B	EX-8808294	0257
1377-01-052-6800	OUTPUT LINE ASSY	1	FB	.0021	1.4B	EX-8808295	0257
1377-01-052-6801	OUTPUT LINE ASSY	1	FB	.0040	1.4B	EX-8808296	0257
1377-01-052-6802	INITIATION LINE ASSY	1	FB	.0052	1.4C	EX-8808297	0276
1377-01-052-8206	CART ASSY HARNESS	1	FB	.0004	1.4C	EX-8808298	0276
1377-01-052-8207	MORTAR CTG	1	FB	.0140	1.4C	EX-8808299	0276
1377-01-052-8208	CTG ASSY	1	FB	.0019	*1.4S	EX-8808300	0014
1377-01-052-8209	REEFING LINE CUTTER	1	FB	.0024	1.4S	EX-8808301	0070
1377-01-052-8210	CUTTER LOCKING CORD	1	FB	.0024	1.4S	EX-8808659	0070
1377-01-053-0537	GAS GEN	1	FB	.0111	1.4C	EX-8808302	0276
1377-01-053-0586	RKT MTR	1	WB	1.10	1.3C	EX-8808303	0186
1377-01-053-0587	RKT MTR	1	WB	.4003	1.3C	EX-8808304	0186
1377-01-053-7833	DET TRANSFER ASSY	1	FB	.0015	1.4S	EX-8808660	0367
1377-01-053-7877	DET TRANSFER ASSY	1	FB	.0007	1.4S	EX-8808661	0367
1377-01-053-7878	DET TRANSFER ASSY	1	FB	.0016	1.4S	EX-8808662	0367
1377-01-053-7879	DET TRANSFER ASSY	1	FB	.0002	1.4S	EX-8808663	0367
1377-01-053-7880	DET TRANSFER ASSY	1	FB	.0024	1.4S	EX-8808664	0367
1377-01-053-7881	DET TRANSFER ASSY	1	FB	.0030	1.4S	EX-8808665	0367
1377-01-053-7882	DET TRANSFER ASSY	1	FB	.0019	1.4S	EX-8808666	0367
1377-01-053-7883	DET TRANSFER ASSY	1	FB	.0019	1.4S	EX-8808667	0367
1377-01-053-7884	DET TRANSFER ASSY	1	FB	.0019	1.4S	EX-8808668	0367
1377-01-053-7885	DET TRANSFER ASSY	1	FB	.8256	1.4S	EX-8808669	0367
1377-01-053-7888	DET TRANSFER ASSY	1	FB	.0019	1.4S	EX-8808670	0367
1377-01-053-7889	DET TRANSFER ASSY	1	FB	.0036	1.4S	EX-8808671	0367
1377-01-053-7891	DET TRANSFER ASSY	1	FB	.0018	1.4S	EX-8808672	0367
1377-01-053-7892	DET TRANSFER ASSY	1	FB	.0036	1.4S	EX-8808673	0367
1377-01-054-2911	INITIATOR	1	FB	.0006	1.4C	EX-8808305	0276
1377-01-054-2912	INITIATOR	1	FB	.0006	1.4C	EX-8808306	0276
1377-01-054-9949	INITIATOR	1	FB	.0030	1.4S	EX-8808674	0367
1377-01-054-9950	DET TRANSFER ASSY	1	FB	.0007	1.4S	EX-8808675	0367
1377-01-055-8621	DET TRANSFER ASSY	1	FB	.0024	1.4S	EX-8808676	0367

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-055-8622	DET TRANSFER ASSY	1	FB	.0017	1.4S	EX-8808677	0367
1377-01-055-8623	DET TRANSFER ASSY	1	FB	.0016	1.4S	EX-8808678	0367
1377-01-055-8624	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808679	0367
1377-01-055-8626	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808680	0367
1377-01-055-8627	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808681	0367
1377-01-055-8628	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808682	0367
1377-01-055-9964	DET TRANSFER ASSY	1	FB	.0067	1.4S	EX-8808307	0367
1377-01-056-0821	RKT CATAPULT, MK16 MOD 1	1	WB	9.0	1.3C	EX-8808308	0186
1377-01-056-4520	DET TRANSFER ASSY	1	FB	.0011	1.4S	EX-8808683	0367
1377-01-056-4521	DET TRANSFER ASSY	1	FB	.0011	1.4S	EX-8808684	0367
1377-01-056-4522	DET TRANSFER ASSY	1	FB	.0027	1.4S	EX-8808685	0367
1377-01-056-4523	DET TRANSFER ASSY	1	FB	.0027	1.4S	EX-8808686	0367
1377-01-056-4524	DET TRANSFER ASSY	1	FB	.0017	1.4S	EX-8808687	0367
1377-01-056-4525	DET TRANSFER ASSY	1	FB	.0012	1.4S	EX-8808688	0367
1377-01-056-4526	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808689	0367
1377-01-056-4527	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808690	0367
1377-01-056-4528	DET TRANSFER ASSY	1	FB	.0043	1.4S	EX-8808691	0367
1377-01-056-4529	DET TRANSFER ASSY	1	FB	.0043	1.4S	EX-8808692	0367
1377-01-056-4530	DET TRANSFER ASSY	1	FB	.0018	1.4S	EX-8808693	0367
1377-01-056-4531	DET TRANSFER ASSY	1	FB	.0017	1.4S	EX-8808694	0367
1377-01-056-4536	CTG DELAY	100	WB	.0002	1.4S	EX-8808309	0323
1377-01-056-8642	LINE ASSY, DET	1	FB	.0067	1.4S	EX-8808310	0367
1377-01-056-8643	RELEASE LINE	1	FB	.0083	1.4S	EX-8808311	0367
1377-01-056-8644	LINE ASSY, DET	1	FB	.0083	1.4S	EX-8808312	0367
1377-01-056-8645	INITIATOR	1	FB	.0098	1.4C	EX-8808313	0276
1377-01-057-0685	CTG, IMPULSE, ARD 446-1	4	FB	.0276	1.4C	EX-8808314	0276
1377-01-057-0686	CTG, IMPULSE, ARD 863-1	8	FB	.0090	1.4C	EX-8808315	0276
1377-01-057-1176	CTG, IMPULSE, MK51 MOD 0	4	FB	.0042	1.4C	EX-8808316	0276
1377-01-057-5430	CTG, IMPULSE, CCU-1/B	4	FB	.0139	1.4C	EX-8808317	0276
1377-01-057-5431	REMOVER	1	FB	.6879	1.3C	EX-8804111	0186
1377-01-058-0122	REMOVER	1	FB	.6879	1.3C	EX-8806174	0186
1377-01-058-7367	CTG, IMPULSE, MK2 MOD 1	4	FB	.0139	1.4C	EX-8808318	0276
1377-01-059-0805	FLSC HOLDER ASSY	1	FB	.0011	1.4D	EX-8808319	0237
1377-01-059-0806	TRANSFER LINE ASSY	1	FB	.0084	1.4B	EX-8808320	0257
1377-01-059-0807	TRANSFER LINE ASSY	1	FB	.0017	1.4B	EX-8808321	0257
1377-01-060-8532	DET CORD	1	*	.0031	1.4D	EX-8801970	0289
1377-01-060-8533	DET CORD	1	*	.0018	1.4D	EX-8801971	0289
1377-01-060-8534	DET CORD	1	*	.0009	1.4D	EX-8801972	0289
1377-01-060-8535	DET CORD	1	*	.0037	1.4D	EX-8801973	0289
1377-01-060-8536	DET CORD	1	*	.0029	1.4D	EX-8801974	0289
1377-01-060-8537	DET CORD	1	*	.0044	1.4D	EX-8801975	0289

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-060-8539	DET CORD	1	*	.0015	1.4D	EX-8801976	0237
1377-01-060-8540	DET CORD	1	*	.0013	1.4D	EX-8801977	0237
1377-01-060-8541	DET CORD	1	*	.0022	1.4D	EX-8801978	0237
1377-01-060-8543	DET CORD	1	*	.0007	1.4S	EX-8801979	0104
1377-01-060-8544	DET CORD	1	*	.0018	1.4S	EX-8801980	0104
1377-01-060-8545	DET CORD	1	*	.0022	1.4S	EX-8801981	0104
1377-01-060-8546	CART INITIATOR	1	*	.0002	1.4S	EX-8801982	0323
1377-01-061-2268	DET TRANSFER ASSY	1	FB	.0012	1.4S	EX-8808695	0367
1377-01-061-5738	CATAPULT, CKU-8/A	1	WB	.1960	1.4C	EX-8808322	0276
1377-01-061-5749	CTG, IMPULSE, CCU-52/B	1	MC	.1660	1.4C	EX-8908024	0276
1377-01-061-5751	CTG, CCU-56/A	1	FB	.1960	1.4C	EX-8808323	0276
1377-01-063-2198	INITIATOR	1	FB	.0005	1.4C	EX-8808324	0276
1377-01-063-3161	CTG, IMPULSE, CCU-44/B	60	MB	.0100	1.4C	EX-8912069	0276
1377-01-063-3163	CTG, IMPULSE	10	FB	.0233	1.4C	EX-8808325	0276
1377-01-063-3164	CTG, IMPULSE	80	WB	.0100	1.4C	EX-8808326	0276
1377-01-063-3165	CTG, IMPULSE	10	FB	.0100	1.4C	EX-8808327	0276
1377-01-063-3166	CTG, IMPULSE	80	WB	.0206	1.4C	EX-8808328	0276
1377-01-063-3167	CTG, IMPULSE	10	FB	.0206	1.4C	EX-8808329	0276
1377-01-063-3168	CTG, IMPULSE	80	WB	.0233	1.4C	EX-8808330	0276
1377-01-063-9732	DET TRANSFER ASSY	1	FB	.0031	1.4S	EX-8808696	0367
1377-01-063-9733	DET TRANSFER ASSY	1	FB	.0030	1.4S	EX-8808697	0367
1377-01-065-7233	DET TRANSFER ASSY	1	FB	.0040	1.4S	EX-8808698	0367
1377-01-065-7234	DET TRANSFER ASSY	1	FB	.0040	1.4S	EX-8808699	0367
1377-01-066-2664	CUTTER, MLU-40A/B	1	FB	.0060	1.4S	EX-8808331	0367
1377-01-069-7770	DET TRANSFER ASSY	1	FB	.0006	1.4S	EX-8808700	0384
1377-01-069-7771	DET, ELEC	1	FB	.0006	1.4S	EX-8808701	0366
1377-01-069-7772	WARHEAD ADAPTER ASSY	1	FB	.0090	1.4B	EX-8808702	0257
1377-01-069-7776	EXPL CORD SET	1	FB	.0145	1.4S	EX-8808332	0349
1377-01-069-7777	EXPL CORD SET	1	FB	.0461	1.4S	EX-8808333	0349
1377-01-073-2190	INITIATOR	1	FB	.0098	1.4C	EX-8808334	0276
1377-01-073-2193	DET TRANSFER ASSY	1	FB	.0016	1.4S	EX-8808703	0367
1377-01-073-2194	DET TRANSFER ASSY	1	FB	.0017	1.4S	EX-8808704	0367
1377-01-073-3831	REFIRE KIT, HH-60	1	FB	.0003	1.4S	EX-8710761	0323
1377-01-073-9444	RELEASE LINE	1	FB	.0082	1.4S	EX-8808335	0367
1377-01-073-9445	RELEASE LINE	1	FB	.0082	1.4S	EX-8808336	0367
1377-01-075-6433	CTG ACTUATED RELEASE ASSY, M5	N/A	N/A	.0033	1.4G	EX-8710762	0276
1377-01-079-2661	DET TRANSFER ASSY	1	FB	.0036	1.4S	EX-8808705	0367
1377-01-079-2662	DET TRANSFER ASSY	1	FB	.0036	1.4S	EX-8808706	0367
1377-01-079-2663	DET TRANSFER ASSY	1	FB	.0040	1.4S	EX-8808707	0367
1377-01-079-2664	DET TRANSFER ASSY	1	FB	.0040	1.4S	EX-8808708	0367
1377-01-079-5328	DET TRANSFER ASSY	1	FB	.0017	1.4S	EX-8808709	0367

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-080-3963	INITIATOR	N/A	N/A	.0001	1.4S	EX-8808710	0323
1377-01-080-8252	CART ENG START, MXU-4A/A	4	FB	8.0	1.4C	EX-8808337	0276
1377-01-081-2993	CTG, IMPULSE, CCU-61/A	*	*	.0003	1.4C	EX-8801983	0276
1377-01-082-4026	DET TRANSFER ASSY	1	FB	.0018	1.4S	EX-8808711	0367
1377-01-082-9453	PRESSURE CTG	N/A	N/A	.0004	1.4C	EX-8808712	0276
1377-01-083-5091	CATAPULT RKT	1	WB	6.4	1.3C	EX-8808338	0186
1377-01-083-8459	FLSC HOLDER ASSY	*	FB	.0011	1.4D	EX-8808339	0237
1377-01-084-6047	CTG, IMPULSE, CCU-58/A	*	*	.0030	1.4C	EX-8801984	0276
1377-01-084-9358	CTG, BOOSTER	*	*	.0001	*1.4S	EX-8912079	0014
1377-01-085-5974	RELEASE BOLT	1	FB	.0018	1.4S	EX-8808340	0173
1377-01-087-2190	DET TRANSFER ASSY	1	FB	.0036	1.4S	EX-8808713	0367
1377-01-087-5166	CTG CUTTER, HH-60	1	FB	.0003	1.4S	EX-8710769	0070
1377-01-088-2321	CATAPULT RKT	1	WB	12.7	1.3C	EX-8808341	0186
1377-01-088-3615	DET TRANSFER ASSY	1	FB	.0036	1.4S	EX-8808714	0367
1377-01-088-5534	ACTUATOR	1	FB	.0155	1.4C	EX-8808342	0276
1377-01-089-0127	CATAPULT RKT	1	WB	12.7	1.3C	EX-8808343	0186
1377-01-089-2859	CTG, CCU-1/B	12	FB	.0139	1.4C	EX-8808344	0276
1377-01-089-2860	CTG, MK17 MOD 1	12	FB	.0031	1.4C	EX-8808345	0276
1377-01-089-2861	CTG, RELEASE	10	FB	.0060	1.4S	EX-8808346	0323
1377-01-089-6201	ACTUATOR KIT	1	FB	.0018	1.4S	EX-8912080	0349
1377-01-089-6216	KIT PARTS CORD ASSY	N/A	N/A	.0309	1.4D	EX-8808347	0289
1377-01-090-7557	CTG, DELAY 4 SEC	*	*	.0002	*1.4S	EX-8912081	0012
1377-01-091-8222	CATAPULT RKT	1	WB	12.7	1.3C	EX-8808348	0186
1377-01-092-5691	CUTTER	2	FB	.0080	1.4S	EX-8808349	0367
1377-01-094-6899	CUTTER ASSY	1	MB	.0009	1.4S	EX-8808350	0070
1377-01-094-7054	INITIATOR, JAU-20/A	1	FB	.0010	1.4S	EX-8710773	0349
1377-01-096-7537	CTG, IMPULSE	1	FB	.0010	1.4C	EX-8808351	0276
1377-01-099-8087	DET TRANSFER ASSY	1	FB	.0019	1.4S	EX-8808715	0367
1377-01-099-8088	DET TRANSFER ASSY	1	FB	.0019	1.4S	EX-8808716	0367
1377-01-099-8089	DET TRANSFER ASSY	1	FB	.0018	1.4S	EX-8808717	0367
1377-01-102-2219	INITIATOR	1	FB	.0098	1.4C	EX-8808352	0276
1377-01-102-8963	INITIATOR	1	FB	.0098	1.4C	EX-8808353	0276
1377-01-103-3350	GAS GEN	1	FB	.0250	1.4C	EX-8912071	0276
1377-01-103-9120	CTG, IMPULSE, CCU-41/B	240	WB	.0006	1.4S	EX-8710778	0432
1377-01-104-2309	CTG ASSY	N/A	N/A	N/A	1.4C	EX-8808719	0276
1377-01-104-8595	INITIATOR, DELAY	1	FB	.0069	1.4C	EX-8808354	0276
1377-01-105-6372	FLEXIBLE CONFINED DET CORD	*	*	.0018	1.4S	EX-8808355	0349
1377-01-108-1438	IGNITION DEVICE	N/A	N/A	.0001	1.4S	EX-8710951A	0432
1377-01-110-6564	GAS GEN	1	FB	.0340	1.4C	EX-8912133	0276
1377-01-110-7306	CTG ACTUATED INIT, JAU-22/B	48	WB	.0130	1.4C	EX-8710782	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-111-6840	DET TRANSFER ASSY	1	FB	.0019	1.4S	EX-8808720	0367
1377-01-112-6951	DET TRANSFER ASSY	1	FB	.0017	1.4S	EX-8808721	0367
1377-01-112-6952	DET TRANSFER ASSY	1	FB	.0017	1.4S	EX-8808722	0367
1377-01-112-6953	DET TRANSFER ASSY	1	FB	.0016	1.4S	EX-8808723	0367
1377-01-112-6954	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808724	0367
1377-01-115-3850	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808725	0367
1377-01-115-3851	DET TRANSFER ASSY	1	FB	.0010	1.4S	EX-8808726	0367
1377-01-116-3197	IGNITION DEVICE, PVU-2A	N/A	N/A	.0001	1.4S	EX-8710796	0044
1377-01-119-4586	INITIATOR	*	*	.0020	1.4S	EX-8808356	0349
1377-01-119-4587	FLEXIBLE CONFINED DET CORD	*	*	.0019	1.4S	EX-8808357	0349
1377-01-119-4588	FLEXIBLE CONFINED DET CORD	*	*	.0007	1.4S	EX-8808358	0349
1377-01-120-1867	SLEEVE & GRAIN ASSY	N/A	N/A	6.7	1.3C	EX-8801985	0274
1377-01-125-2127	BOOSTER, FUZE, MK35 MOD 0	1	WB	.0072	1.1D	EX-8808727	0042
1377-01-125-9407	PRESSURE ACTIVATED EXPL DEVICE	*	FB	.0002	1.4C	EX-8808359	0276
1377-01-125-9500	SHIELDED MILD DET CORD	N/A	N/A	.0142	1.4D	EX-8808360	0237
1377-01-125-9501	SHIELDED MILD DET CORD	N/A	N/A	.0142	1.4D	EX-8808361	0237
1377-01-125-9502	SHIELDED MILD DET CORD	N/A	N/A	.0116	1.4D	EX-8808362	0237
1377-01-125-9503	SHIELDED MILD DET CORD	N/A	N/A	.0116	1.4D	EX-8808363	0237
1377-01-125-9504	SHIELDED MILD DET CORD	N/A	N/A	.0113	1.4D	EX-8808364	0237
1377-01-125-9505	SHIELDED MILD DET CORD	N/A	N/A	.0124	1.4D	EX-8808365	0237
1377-01-125-9506	SHIELDED MILD DET CORD	N/A	N/A	.0124	1.4D	EX-8808366	0237
1377-01-126-7690	GAS GEN	*	FB	.0159	1.4C	EX-8808367	0276
1377-01-128-8405	ELEC DET	N/A	N/A	.0007	1.4B		0257
1377-01-132-7478	CABLE CUTTER	1	FB	.0003	1.4S	EX-8808368	0070
1377-01-133-1957	CABLE CUTTER	1	FB	.0003	1.4S	EX-8808369	0070
1377-01-137-6037	INITIATOR	*	FB	.0118	1.4C	EX-8808728	0276
1377-01-137-6038	INITIATOR	*	FB	.0016	1.4C	EX-8808729	0276
1377-01-137-6039	INITIATOR, 1.0 SEC DELAY	*	FB	.0070	1.4C	EX-8808730	0276
1377-01-137-6040	INITIATOR, .30 SEC DELAY	*	FB	.0031	1.4C	EX-8808731	0276
1377-01-137-6041	CATAPULT	N/A	N/A	.2488	1.4C	EX-8808732	0276
1377-01-137-6052	RKT MTR	1	WB	2.7	1.3C	EX-8808733	0186
1377-01-138-1551	DROGUE GUN	1	FB	.0033	1.4S	EX-8808734	0323
1377-01-138-1552	DROGUE GUN	1	FB	.0033	1.4S	EX-8808735	0323
1377-01-139-2835	DET TRANSFER ASSY	1	FB	.0015	1.4S	EX-8804110	0367
1377-01-140-4251	CUTTER, CTG, ACT, 16 SEC DELAY	100	FB	.0001	1.4S	EX-8411076	0070
1377-01-140-4415	DET TRANSFER ASSY	1	FB	.0007	1.4S	EX-8806173	0367
1377-01-141-2968	QF 100 SHIP SET	1	WB	7.4	1.3C	EX-8808370	0186
1377-01-141-8911	REEL ASSY INERTIA	1	FB	.0077	1.4S	EX-8808371	0323
1377-01-144-8481	DET TRANSFER ASSY	1	FB	.0043	1.4S	EX-8808736	0367
1377-01-144-8482	DET TRANSFER ASSY	1	FB	.0043	1.4S	EX-8808737	0367
1377-01-156-4139	CABLE CUTTER	1	FB	.0004	1.4S	EX-8808372	0070

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-160-6506	DET TRANSFER ASSY	1	FB	.0006	1.4S	EX-8808738	0367
1377-01-165-2080	INITIATOR	1	FB	.0013	1.4C	EX-8912086	0276
1377-01-166-1350	CART DELAY, .5 SEC	N/A	N/A	.0005	*1.4S	EX-8912084	0012
1377-01-166-4149	WARHEAD ADAPTER ASSY	1	FB	.0088	1.4B	EX-8808373	0257
1377-01-166-4261	INITIATOR	1	FB	.0069	1.4C	EX-8808739	0276
1377-01-166-4262	INITIATOR	1	FB	.0013	1.4C	EX-8912083	0276
1377-01-166-4263	INITIATOR	N/A	N/A	.0005	1.4C	EX-8808374	0276
1377-01-166-4264	INITIATOR	N/A	N/A	.0009	1.4C	EX-8912082	0276
1377-01-166-4265	INITIATOR	N/A	N/A	.0014	1.4C	EX-8808375	0276
1377-01-166-4266	INITIATOR	1	FB	.0005	1.4C	EX-8808376	0276
1377-01-167-6621	INITIATOR	1	FB	.0003	1.4C	EX-8912090	0276
1377-01-168-2559	CART DELAY, .25 SEC	N/A	N/A	.0005	*1.4S	EX-8910200	0012
1377-01-168-4419	CART DELAY, 1.0 SEC	N/A	N/A	.0005	*1.4S	EX-8912135	0012
1377-01-169-7797	CATAPULT RKT CKU-5A/A	1	WB	5.5	1.3C	EX-8808740	0186
1377-01-173-3074	CTG, GAS GEN	1	MB	5.3	1.3C	EX-8808377	0275
1377-01-178-6691	CTG, DELAY, CCU-89/A	10	FB	.0006	1.4S	EX-8710952	0323
1377-01-180-3094	SHIELDED MILD DET CORD	1	FB	.0006	1.4S	EX-8808378	0349
1377-01-184-1177	CTG, DELAY, CCU-88/A	2	MC	.0004	1.4S	EX-8710953	0323
1377-01-184-1178	CTG, DELAY, CCU-87/A	2	MC	.0009	1.4S	EX-8710954	0323
1377-01-184-4667	CTG, DELAY, CCU-86/A	2	MC	.0003	1.4S	EX-8710956	0323
1377-01-185-2622	CTG, FIRE EXTINGUISHER	*	FB	.0031	1.4S	EX-8710959	0323
1377-01-198-7480	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808741	0367
1377-01-198-7481	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808742	0367
1377-01-198-7482	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808743	0367
1377-01-198-7483	DET TRANSFER ASSY	1	FB	.0005	1.4S	EX-8808744	0367
1377-01-198-7484	DET TRANSFER ASSY	1	FB	.0005	1.4S	EX-8808745	0367
1377-01-198-7485	DET TRANSFER ASSY	1	FB	.0005	1.4S	EX-8808746	0367
1377-01-200-2429	DET TRANSFER ASSY	1	FB	.0015	1.4S	EX-8808747	0367
1377-01-200-9008	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808748	0367
1377-01-200-9009	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808749	0367
1377-01-200-9010	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808750	0367
1377-01-200-9011	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808751	0367
1377-01-200-9012	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808752	0367
1377-01-200-9013	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808753	0367
1377-01-200-9014	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808754	0367
1377-01-200-9015	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808755	0367
1377-01-200-9016	DET TRANSFER ASSY	1	FB	.0005	1.4S	EX-8808756	0367
1377-01-200-9017	DET TRANSFER ASSY	1	FB	.0005	1.4S	EX-8808757	0367
1377-01-200-9018	DET TRANSFER ASSY	1	FB	.0005	1.4S	EX-8808758	0367
1377-01-200-9019	DET TRANSFER ASSY	1	FB	.0005	1.4S	EX-8808759	0367
1377-01-201-5515	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8808760	0367

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-202-9195	CTG, IMPULSE	1	FB	.0529	1.4C	EX-8808379	0276
1377-01-203-1959	INITIATOR	1	FB	.0013	1.4C	EX-8808380	0276
1377-01-203-1960	INITIATOR	1	FB	.0013	1.4C	EX-8808381	0276
1377-01-203-1961	INITIATOR	1	FB	.0005	1.4C	EX-8808382	0276
1377-01-203-8651	INITIATOR	1	FB	.0006	1.4C	EX-8808383	0276
1377-01-203-9713	DET TRANSFER ASSY	1	FB	.0015	1.4S	EX-8808761	0367
1377-01-207-7089	INITIATOR ASSY (TYPE IV)	*	FB	.0020	1.4S	EX-8808762	0367
1377-01-207-7090	INITIATOR ASSY (TYPE III)	*	FB	.0005	1.4S	EX-8808763	0367
1377-01-207-7091	INITIATOR ASSY (TYPE II)	*	FB	.0005	1.4S	EX-8808764	0367
1377-01-208-1090	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808765	0257
1377-01-208-1091	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808766	0257
1377-01-208-8646	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808767	0257
1377-01-209-3847	INITIATOR ASSY (TYPE I)	*	FB	.0020	1.4S	EX-8808768	0367
1377-01-211-7211	CTG, IMPULSE, CCU-92/A	1	MB	.0004	1.4C	EX-8810343	0276
1377-01-211-7212	THRUSTER, CTG ACTUATED	1	MB	.0004	1.4S	EX-8810344	0323
1377-01-212-8583	CTG, IMPULSE	1	FB	.0003	1.4C	EX-8809433	0276
1377-01-213-3090	GEN, GAS	*	*	.0077	*1.4S	EX-8808384	0012
1377-01-216-4889	CTG, .75 SEC DELAY	*	FB	.0005	*1.4S	EX-8808385	0012
1377-01-216-5958	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808769	0257
1377-01-216-5959	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808770	0257
1377-01-216-5960	CORD ASSY, DET	1	FB	.0003	1.4B	EX-8808771	0257
1377-01-216-5961	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808772	0257
1377-01-216-5962	CORD ASSY, DET	1	FB	.0022	1.4B	EX-8808773	0257
1377-01-216-5963	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808774	0257
1377-01-216-5964	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808775	0257
1377-01-216-6090	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808776	0257
1377-01-216-6091	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808777	0257
1377-01-216-6979	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808778	0257
1377-01-216-6980	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808779	0257
1377-01-217-0276	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808780	0257
1377-01-217-3309	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808781	0257
1377-01-217-3310	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808782	0257
1377-01-217-3311	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808783	0257
1377-01-217-3312	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808784	0257
1377-01-217-3313	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808785	0257
1377-01-218-0335	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808786	0257
1377-01-218-0336	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808787	0257
1377-01-218-0337	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808788	0257
1377-01-218-0338	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808789	0257
1377-01-218-0339	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8808790	0257
1377-01-218-0340	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808791	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-218-0341	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808792	0257
1377-01-218-0342	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808793	0257
1377-01-218-0343	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808794	0257
1377-01-218-0344	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808795	0257
1377-01-218-0345	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808796	0257
1377-01-218-0346	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808797	0257
1377-01-218-0347	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808798	0257
1377-01-218-0348	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808799	0257
1377-01-218-0349	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808800	0257
1377-01-218-0350	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808801	0257
1377-01-218-0351	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808802	0257
1377-01-218-3964	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808803	0257
1377-01-218-7719	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808804	0257
1377-01-218-7720	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808805	0257
1377-01-218-7721	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808806	0257
1377-01-218-7722	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808807	0257
1377-01-218-7723	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808808	0257
1377-01-218-7724	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808809	0257
1377-01-218-7838	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808810	0257
1377-01-218-8633	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808811	0257
1377-01-218-8634	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808812	0257
1377-01-220-1301	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808813	0257
1377-01-220-2923	DET TRANSFER ASSY	1	FB	.0003	1.4B	EX-8808814	0257
1377-01-220-2924	DET TRANSFER ASSY	1	FB	.0006	1.4B	EX-8808815	0257
1377-01-220-2925	DET TRANSFER ASSY	1	FB	.0003	1.4B	EX-8808816	0257
1377-01-220-2926	DET TRANSFER ASSY	1	FB	.0006	1.4B	EX-8808817	0257
1377-01-220-2927	DET TRANSFER ASSY	1	FB	.0003	1.4B	EX-8808818	0257
1377-01-220-4097	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808819	0257
1377-01-220-4098	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8808820	0257
1377-01-220-4099	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808821	0257
1377-01-220-4100	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808822	0257
1377-01-220-4101	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808823	0257
1377-01-220-4102	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808824	0257
1377-01-220-4103	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808825	0257
1377-01-220-4104	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808826	0257
1377-01-220-4105	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808827	0257
1377-01-220-4106	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808828	0257
1377-01-220-4107	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808829	0257
1377-01-220-4108	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808830	0257
1377-01-220-4109	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808831	0257
1377-01-220-4110	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808832	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-220-4111	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808833	0257
1377-01-220-4112	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808834	0257
1377-01-220-4113	DET TRANSFER ASSY	1	FB	.0005	1.4B	EX-8808835	0257
1377-01-220-4114	DET TRANSFER ASSY	1	FB	.0011	1.4B	EX-8808836	0257
1377-01-220-4115	DET TRANSFER ASSY	1	FB	.0011	1.4B	EX-8808837	0257
1377-01-220-4116	DET TRANSFER ASSY	1	FB	.0015	1.4B	EX-8808838	0257
1377-01-220-4117	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808839	0257
1377-01-220-6338	DET TRANSFER ASSY	1	FB	.0016	1.4B	EX-8808840	0257
1377-01-220-9123	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808841	0257
1377-01-220-9124	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808842	0257
1377-01-220-9125	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808843	0257
1377-01-220-9126	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808844	0257
1377-01-220-9127	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8808845	0257
1377-01-220-9128	CORD ASSY, DET	1	FB	.0019	1.4B	EX-8808846	0257
1377-01-220-9129	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808847	0257
1377-01-220-9130	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808848	0257
1377-01-220-9131	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8808849	0257
1377-01-220-9132	DET TRANSFER ASSY	1	FB	.0030	1.4B	EX-8808850	0257
1377-01-221-0197	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808851	0257
1377-01-221-0198	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808852	0257
1377-01-221-0199	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808853	0257
1377-01-221-0200	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808854	0257
1377-01-221-1972	DET TRANSFER ASSY	1	FB	.0025	1.4B	EX-8808855	0257
1377-01-221-1973	DET TRANSFER ASSY	1	FB	.0010	1.4B	EX-8808856	0257
1377-01-221-3744	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808857	0257
1377-01-221-3745	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808858	0257
1377-01-221-3955	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808859	0257
1377-01-221-7590	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808860	0257
1377-01-221-8635	CUTTER, BRIDAL	*	FB	.0066	1.4C	EX-8808861	0276
1377-01-221-8636	CUTTER, BRIDAL	*	FB	.0066	1.4C	EX-8808862	0276
1377-01-222-2029	CTG, 2 SEC DELAY	*	FB	.0005	*1.4S	EX-8912085	0012
1377-01-223-2317	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808863	0257
1377-01-223-2318	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808864	0257
1377-01-223-3358	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808865	0257
1377-01-223-3359	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808866	0257
1377-01-223-3360	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808867	0257
1377-01-229-3732	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808868	0257
1377-01-229-3733	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808869	0257
1377-01-229-3734	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808870	0257
1377-01-229-3735	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808871	0257
1377-01-229-3736	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808872	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-229-3737	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8808873	0257
1377-01-229-3738	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808874	0257
1377-01-229-3739	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808875	0257
1377-01-229-3740	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808876	0257
1377-01-229-3741	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808877	0257
1377-01-229-3742	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808878	0257
1377-01-229-3743	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808879	0257
1377-01-229-3744	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808880	0257
1377-01-229-3745	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808881	0257
1377-01-229-3746	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808882	0257
1377-01-229-3747	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808883	0257
1377-01-229-3748	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808884	0257
1377-01-229-3749	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808885	0257
1377-01-229-3750	CORD ASSY, DET	1	FB	.0022	1.4B	EX-8808886	0257
1377-01-229-5797	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808887	0257
1377-01-229-5798	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808888	0257
1377-01-229-5799	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808889	0257
1377-01-229-5800	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808890	0257
1377-01-229-5801	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808891	0257
1377-01-229-5802	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808892	0257
1377-01-229-5803	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808893	0257
1377-01-229-5804	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808894	0257
1377-01-229-5805	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808895	0257
1377-01-229-5806	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808896	0257
1377-01-229-5807	CORD ASSY, DET	1	FB	.0023	1.4B	EX-8808897	0257
1377-01-229-5808	CORD ASSY, DET	1	FB	.0023	1.4B	EX-8808898	0257
1377-01-229-5809	CORD ASSY, DET	1	FB	.0024	1.4B	EX-8808899	0257
1377-01-229-5810	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808900	0257
1377-01-229-5811	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808901	0257
1377-01-229-5812	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808902	0257
1377-01-229-5813	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808903	0257
1377-01-229-7648	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808904	0257
1377-01-229-7649	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808905	0257
1377-01-229-7650	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808906	0257
1377-01-229-7651	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808907	0257
1377-01-229-7652	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808908	0257
1377-01-229-7653	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808909	0257
1377-01-229-7654	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8808910	0257
1377-01-229-7655	CORD ASSY, DET	1	FB	.0022	1.4B	EX-8808911	0257
1377-01-229-7656	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808912	0257
1377-01-229-7657	CORD ASSY, DET	1	FB	.0022	1.4B	EX-8808913	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-229-7658	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808914	0257
1377-01-229-7659	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808915	0257
1377-01-229-7660	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808916	0257
1377-01-229-7661	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8808917	0257
1377-01-229-7662	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8808918	0257
1377-01-229-7663	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808919	0257
1377-01-229-7664	CORD ASSY, DET	1	RB	.0014	1.4B	EX-8808920	0257
1377-01-229-7665	CORD ASSY, DET	1	FB	.0025	1.4B	EX-8808921	0257
1377-01-229-7666	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808922	0257
1377-01-229-7667	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808923	0257
1377-01-230-5023	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808924	0257
1377-01-230-5999	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808925	0257
1377-01-230-6000	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808926	0257
1377-01-230-8631	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8808927	0257
1377-01-230-8632	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808928	0257
1377-01-230-8633	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808929	0257
1377-01-230-8634	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808930	0257
1377-01-230-8635	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808931	0257
1377-01-230-8636	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808932	0257
1377-01-230-8637	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808933	0257
1377-01-230-8638	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808934	0257
1377-01-230-8639	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808935	0257
1377-01-230-8640	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8808936	0257
1377-01-230-8641	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808937	0257
1377-01-230-9490	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8808938	0257
1377-01-230-9491	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808939	0257
1377-01-230-9492	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808940	0257
1377-01-230-9493	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808941	0257
1377-01-230-9494	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808942	0257
1377-01-230-9495	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808943	0257
1377-01-230-9496	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808944	0257
1377-01-230-9497	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808945	0257
1377-01-230-9498	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808946	0257
1377-01-230-9499	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808947	0257
1377-01-230-9500	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808948	0257
1377-01-230-9501	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808949	0257
1377-01-230-9502	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808950	0257
1377-01-230-9503	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8808951	0257
1377-01-230-9504	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808952	0257
1377-01-230-9505	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808953	0257
1377-01-230-9506	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8808954	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR =RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-230-9507	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808955	0257
1377-01-231-0826	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808956	0257
1377-01-231-0827	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808957	0257
1377-01-231-0828	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808958	0257
1377-01-231-0829	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8808959	0257
1377-01-231-0830	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808960	0257
1377-01-231-0831	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8808961	0257
1377-01-231-0832	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808962	0257
1377-01-231-0833	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808963	0257
1377-01-231-0834	CORD ASSY, DET	1	FB	.0023	1.4B	EX-8808964	0257
1377-01-231-0835	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808965	0257
1377-01-231-0836	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808966	0257
1377-01-231-0837	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8808967	0257
1377-01-231-0838	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808968	0257
1377-01-231-0839	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808969	0257
1377-01-231-0840	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808970	0257
1377-01-231-0841	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808971	0257
1377-01-231-0842	CORD ASSY, DET	1	FB	.0025	1.4B	EX-8808972	0257
1377-01-231-0843	CORD ASSY, DET	1	FB	.0023	1.4B	EX-8808973	0257
1377-01-231-0844	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808974	0257
1377-01-231-0845	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808975	0257
1377-01-231-0846	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808976	0257
1377-01-231-0847	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808977	0257
1377-01-231-0848	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8808978	0257
1377-01-231-0849	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808979	0257
1377-01-231-0850	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808980	0257
1377-01-231-0851	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808981	0257
1377-01-231-0852	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808982	0257
1377-01-231-1049	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808983	0257
1377-01-231-1050	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808984	0257
1377-01-231-1051	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808985	0257
1377-01-231-1052	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808986	0257
1377-01-231-1053	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808987	0257
1377-01-231-1054	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8808988	0257
1377-01-231-1055	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808989	0257
1377-01-231-1056	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808990	0257
1377-01-231-1057	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808991	0257
1377-01-231-1058	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8808992	0257
1377-01-231-1059	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8808993	0257
1377-01-231-1060	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8808994	0257
1377-01-231-1061	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8808995	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-231-1062	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8808996	0257
1377-01-231-1063	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8808997	0257
1377-01-231-1064	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808998	0257
1377-01-231-1065	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8808999	0257
1377-01-231-1066	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807289	0257
1377-01-231-1067	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807290	0257
1377-01-231-1068	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8807291	0257
1377-01-231-1069	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807292	0257
1377-01-231-1070	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807293	0257
1377-01-231-1071	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807294	0257
1377-01-231-1072	LINE ASSY, TRANSFER	1	FB	.0004	1.4B	EX-8807295	0257
1377-01-231-1073	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807296	0257
1377-01-231-1074	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807297	0257
1377-01-231-1075	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807298	0257
1377-01-231-1076	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807299	0257
1377-01-231-1077	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807300	0257
1377-01-231-1078	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807301	0257
1377-01-231-1079	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8807302	0257
1377-01-231-1080	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807303	0257
1377-01-231-1081	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807304	0257
1377-01-231-1082	CORD ASSY, DET	1	FB	.0023	1.4B	EX-8807305	0257
1377-01-231-1083	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807306	0257
1377-01-231-1084	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807307	0257
1377-01-231-1085	CORD ASSY, DET	1	FB	.0024	1.4B	EX-8807308	0257
1377-01-231-1086	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807309	0257
1377-01-231-6377	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807310	0257
1377-01-231-6378	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8807311	0257
1377-01-231-6379	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807312	0257
1377-01-232-4168	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807313	0257
1377-01-232-4169	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807314	0257
1377-01-232-4170	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8807315	0257
1377-01-232-4171	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807316	0257
1377-01-232-4172	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807317	0257
1377-01-232-4173	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807318	0257
1377-01-232-4174	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807319	0257
1377-01-232-4175	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807320	0257
1377-01-232-4176	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807321	0257
1377-01-232-4177	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807322	0257
1377-01-232-4178	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807323	0257
1377-01-232-4179	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807324	0257
1377-01-232-4180	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807325	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		=RDS 3	TYPE 4	NEW 5			
1377-01-232-4181	CORD ASSY, DET	1	FB	.0024	1.4B	EX-8807326	0257
1377-01-232-4182	CORD ASSY, DET	1	FB	.0024	1.4B	EX-8807327	0257
1377-01-232-4183	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807328	0257
1377-01-232-6296	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807329	0257
1377-01-232-6297	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807330	0257
1377-01-232-6298	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807331	0257
1377-01-232-6299	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807332	0257
1377-01-232-6300	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807333	0257
1377-01-232-6301	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807334	0257
1377-01-232-6302	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807335	0257
1377-01-232-6303	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807336	0257
1377-01-232-6304	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807337	0257
1377-01-232-6305	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807338	0257
1377-01-232-6306	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807339	0257
1377-01-232-6307	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807340	0257
1377-01-232-6308	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807341	0257
1377-01-232-6309	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807342	0257
1377-01-232-6310	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807343	0257
1377-01-232-6311	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807344	0257
1377-01-232-6312	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807345	0257
1377-01-232-6313	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807346	0257
1377-01-232-6314	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807347	0257
1377-01-232-6316	INITIATOR	*	FB	.0400	1.4S	EX-8807348	0454
1377-01-232-6320	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807349	0257
1377-01-232-6384	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807350	0257
1377-01-232-6385	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807351	0257
1377-01-232-6386	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8807352	0257
1377-01-232-6387	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807353	0257
1377-01-232-6388	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807354	0257
1377-01-232-6389	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807355	0257
1377-01-232-6390	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807356	0257
1377-01-232-6391	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807357	0257
1377-01-232-6392	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807358	0257
1377-01-232-6393	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807359	0257
1377-01-232-6394	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807360	0257
1377-01-232-6395	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807361	0257
1377-01-232-6396	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807362	0257
1377-01-232-6397	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807363	0257
1377-01-232-6398	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807364	0257
1377-01-232-6399	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807365	0257
1377-01-232-6400	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807366	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-232-6401	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807367	0257
1377-01-232-6402	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807368	0257
1377-01-232-6403	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807369	0257
1377-01-232-6404	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807370	0257
1377-01-232-6405	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807371	0257
1377-01-232-6406	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807372	0257
1377-01-232-6407	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807373	0257
1377-01-232-6408	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807374	0257
1377-01-232-6409	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807375	0257
1377-01-232-6410	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807376	0257
1377-01-232-6411	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807377	0257
1377-01-232-6412	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807378	0257
1377-01-232-6413	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807379	0257
1377-01-232-8258	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807380	0257
1377-01-232-8259	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807381	0257
1377-01-232-8260	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807382	0257
1377-01-232-8261	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807383	0257
1377-01-232-8262	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807384	0257
1377-01-232-8263	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8807385	0257
1377-01-232-8264	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807386	0257
1377-01-232-8265	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8807387	0257
1377-01-232-8266	CORD ASSY, DET	1	FB	.0022	1.4B	EX-8807388	0257
1377-01-232-8267	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807389	0257
1377-01-232-8268	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807390	0257
1377-01-232-8269	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807391	0257
1377-01-232-8270	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807392	0257
1377-01-232-8271	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807393	0257
1377-01-232-8272	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807394	0257
1377-01-232-8273	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807395	0257
1377-01-232-8274	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807396	0257
1377-01-232-8275	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807397	0257
1377-01-232-8276	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8807398	0257
1377-01-232-8277	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807399	0257
1377-01-232-8278	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807400	0257
1377-01-232-8279	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807401	0257
1377-01-232-8280	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807402	0257
1377-01-232-8281	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807403	0257
1377-01-232-8282	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807404	0257
1377-01-232-8283	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807405	0257
1377-01-232-8284	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807406	0257
1377-01-232-8285	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807407	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-232-8286	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807408	0257
1377-01-232-8287	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807409	0257
1377-01-232-8288	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807410	0257
1377-01-232-8289	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807411	0257
1377-01-232-8290	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807412	0257
1377-01-232-8291	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807413	0257
1377-01-232-8292	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807414	0257
1377-01-232-8293	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807415	0257
1377-01-232-8294	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8807416	0257
1377-01-232-8295	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807417	0257
1377-01-232-8296	CORD ASSY, DET	1	FB	.0019	1.4B	EX-8807418	0257
1377-01-232-8297	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807419	0257
1377-01-232-8298	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8807420	0257
1377-01-232-8299	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807421	0257
1377-01-232-9360	CORD ASSY, DET	1	FB	.0023	1.4B	EX-8807422	0257
1377-01-232-9361	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807423	0257
1377-01-233-0280	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807424	0257
1377-01-233-0982	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807425	0257
1377-01-233-2238	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8807426	0257
1377-01-233-2239	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807427	0257
1377-01-233-2240	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807428	0257
1377-01-233-2241	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807429	0257
1377-01-233-2242	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807430	0257
1377-01-233-2243	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807431	0257
1377-01-233-2244	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807432	0257
1377-01-233-2245	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807433	0257
1377-01-233-2246	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807434	0257
1377-01-233-2247	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807435	0257
1377-01-233-2248	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807436	0257
1377-01-233-2249	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807437	0257
1377-01-233-2250	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807438	0257
1377-01-233-2251	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807439	0257
1377-01-233-2252	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807440	0257
1377-01-233-2253	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807441	0257
1377-01-233-2254	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807442	0257
1377-01-233-2255	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807443	0257
1377-01-233-2256	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807444	0257
1377-01-233-2257	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807445	0257
1377-01-233-2258	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807446	0257
1377-01-233-2259	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807447	0257
1377-01-233-2260	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807448	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-233-2261	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807449	0257
1377-01-233-2262	CORD ASSY, DET	1	FB	.0015	1.4B		0257
1377-01-233-2263	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807450	0257
1377-01-233-2264	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807451	0257
1377-01-233-2643	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807452	0257
1377-01-233-2644	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807453	0257
1377-01-233-2645	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807454	0257
1377-01-233-2646	CORD ASSY, DET	1	FB	.0005	1.4B	EX-8807455	0257
1377-01-233-2647	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807456	0257
1377-01-233-2648	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807457	0257
1377-01-233-2649	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807458	0257
1377-01-233-2650	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807459	0257
1377-01-233-2651	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807460	0257
1377-01-233-2652	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807461	0257
1377-01-233-2653	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807462	0257
1377-01-233-2654	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807463	0257
1377-01-233-2655	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807464	0257
1377-01-233-2656	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807465	0257
1377-01-233-2657	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807466	0257
1377-01-233-2658	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807467	0257
1377-01-233-2659	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807468	0257
1377-01-233-2660	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807469	0257
1377-01-233-2661	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807470	0257
1377-01-233-2662	CORD ASSY, DET	1	FB	.0028	1.4B	EX-8807471	0257
1377-01-233-2663	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807472	0257
1377-01-233-2664	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807473	0257
1377-01-233-2665	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807474	0257
1377-01-233-2666	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807475	0257
1377-01-233-2667	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807476	0257
1377-01-233-2668	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807477	0257
1377-01-233-2669	CORD ASSY, DET	1	FB	.0022	1.4B	EX-8807478	0257
1377-01-233-2670	CORD ASSY, DET	1	FB	.0021	1.4B	EX-8807479	0257
1377-01-233-2671	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807480	0257
1377-01-233-2672	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807481	0257
1377-01-233-2673	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807482	0257
1377-01-233-2674	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807483	0257
1377-01-233-2675	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807484	0257
1377-01-233-2676	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807485	0257
1377-01-233-2677	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807486	0257
1377-01-233-2678	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807487	0257
1377-01-233-2679	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807488	0257

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-233-2680	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807489	0257
1377-01-233-2681	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807490	0257
1377-01-233-2682	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807491	0257
1377-01-233-2683	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807492	0257
1377-01-233-2684	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807493	0257
1377-01-233-2685	CORD ASSY, DET	1	FB	.0017	1.4B	EX-8807494	0257
1377-01-233-2686	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807495	0257
1377-01-233-2687	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807496	0257
1377-01-233-2688	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807497	0257
1377-01-233-2689	CORD ASSY, DET	1	FB	.0016	1.4B	EX-8807498	0257
1377-01-233-2690	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807499	0257
1377-01-233-2691	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807500	0257
1377-01-233-2692	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807501	0257
1377-01-233-2693	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807502	0257
1377-01-233-2694	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807503	0257
1377-01-233-2695	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807504	0257
1377-01-233-2696	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807505	0257
1377-01-233-2697	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807506	0257
1377-01-233-2698	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807507	0257
1377-01-233-2699	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807508	0257
1377-01-233-2700	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807509	0257
1377-01-233-2701	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807510	0257
1377-01-233-2702	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807511	0257
1377-01-234-0706	DROGUE, FLSA SEVERANCE	*	FB	.0007	1.4D	EX-8912073	0237
1377-01-234-6207	CABLE CUTTER, RETENTION RELEASE SYSTEM	*	FB	.0024	1.4S	EX-8805191	0070
1377-01-234-8510	INITIATOR, SMDC/CDC	*	FB	.0023	1.4C		0276
1377-01-234-8671	CORD ASSY, DET	1	FB	.0015	1.4B	EX-8807515	0257
1377-01-234-8672	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807516	0257
1377-01-235-1046	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807517	0257
1377-01-236-3516	LINEAR CHARG ASSY (TYPE I)	2	WB	.0794	1.4D	EX-8807518	0410
1377-01-236-3517	LINEAR CHARGE ASSY (TYPE II)	2	WB	.0794	1.4D	EX-8807519	0410
1377-01-237-2343	CTG, DISCHARGE	*	FB	.0072	1.4S	EX-8808386	0323
1377-01-237-4417	MODE SELECTOR	1	FB	.0013	1.4S	EX-8912087	0173
1377-01-238-3644	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807520	0257
1377-01-240-3600	DET TRANSFER ASSY	1	FB	.0009	1.4S	EX-8807521	0367
1377-01-241-7982	CONNECTOR, EXPLO TRANSFER	*	FB	.0007	1.4S		0367
1377-01-241-8045	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8807522	0349
1377-01-241-8046	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8807523	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-241-8047	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8807524	0349
1377-01-241-8048	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8807525	0349
1377-01-241-8049	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8807526	0349
1377-01-241-8050	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8807527	0349
1377-01-241-8149	TIME DELAY, 75 SECONDS	*	FB	.0034	1.4S	EX-8804116	0367
1377-01-241-8150	TIME DELAY, .35 SECOND	*	FB	.0018	1.4S	EX-8805196	0367
1377-01-242-2036	ONE-WAY TRANSFER	*	FB	.0013	1.4S	EX-8809144	0384
1377-01-242-4838	CUTTER, ROD END	*	WB	.0007	1.4S	EX-8808387	0070
1377-01-243-0320	CONNECTOR, EXPLO TRANSFER	*	FB	.0010	1.4S		0367
1377-01-243-0321	CONNECTOR, EXPLO TRANSFER	*	FB	.0004	1.4S		0367
1377-01-243-0322	CONNECTOR, EXPLO TRANSFER	*	FB	.0004	1.4S		0367
1377-01-243-0323	CONNECTOR, EXPLO TRANSFER	*	FB	.0010	1.4S		0367
1377-01-244-4117	INITIATOR, LAUNCH BLEED-DOWN VALVE	*	FB	.0003	1.4C	EX-8812001	0351
1377-01-246-1728	INITIATOR, DELAY	*	FB	.0030	1.4S	EX-8812117	0454
1377-01-248-6391	CABLE MECHANISM ASSY, STAGE II	1	FB	.0047	1.4S	EX-8805193	0070
1377-01-248-8709	CABLE CUTTER, LAUNCH SEAL	1	FB	.0024	1.4S	EX-8807528	0070
1377-01-250-1291	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807529	0257
1377-01-250-1292	DET TRANSFER ASSY	1	FB	.0015	1.4S	EX-8807530	0367
1377-01-250-1293	DET TRANSFER ASSY	1	FB	.0015	1.4S	EX-8807531	0367
1377-01-251-8522	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808388	0349
1377-01-251-8523	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808389	0349
1377-01-251-8524	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808390	0349
1377-01-251-8525	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808391	0349
1377-01-251-8526	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808392	0349
1377-01-251-8527	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808393	0349
1377-01-251-8528	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808394	0349
1377-01-251-8529	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808395	0349
1377-01-251-8530	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808396	0349
1377-01-251-8531	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808397	0349
1377-01-251-8532	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808398	0349
1377-01-251-8533	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808399	0349
1377-01-251-8534	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808400	0349
1377-01-251-8535	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808401	0349
1377-01-251-8536	CORD ASSY, DET	1	FB	.0010	1.4S	EX-8808402	0349
1377-01-251-8537	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808403	0349
1377-01-251-8538	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808404	0349
1377-01-251-8539	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808405	0349
1377-01-251-8540	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808406	0349
1377-01-251-8541	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808407	0349
1377-01-251-8542	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808408	0349
1377-01-251-8543	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808409	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-252-7039	CORD ASSY, DET	1	FB	.0009	1.4S	EX-8808410	0349
1377-01-252-9821	CORD ASSY, DET	1	FB	.0008	1.4S	EX-8808411	0349
1377-01-252-9822	CORD ASSY, DET	1	FB	.0006	1.4S	EX-8808412	0349
1377-01-254-4714	CORD ASSY, DET	1	FB	.0007	1.4S	EX-8808413	0349
1377-01-254-8611	CORD ASSY DET	1	FB	.0014	1.4B	EX-8807532	0257
1377-01-254-8612	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807533	0367
1377-01-254-8613	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807534	0367
1377-01-255-1598	CTG, FIRE EXTINGUISHER	*	FB	.0009	1.4S	EX-8901215	0323
1377-01-255-1650	RKT MTR	1	WB	1.1	1.3C	EX-8808414	0186
1377-01-255-2382	CTG, FIRE EXTINGUISHER	*	FB	.0009	1.4S	EX-8901214	0323
1377-01-257-9467	INITIATOR	1	FB	.0006	1.4C	EX-8808415	0276
1377-01-260-6410	INITIATOR	*	FB	.0044	1.4C	EX-8807535	0276
1377-01-262-0521	INITIATOR	1	FB	.0005	1.4C	EX-8912072	0276
1377-01-269-8061	INITIATOR	*	FB	.0023	1.4C	EX-8807536	0276
1377-01-271-5483	AND GATE, TYPE 1	*	FB	.0003	1.4S	EX-8912074	0173
1377-01-271-5484	AND GATE, TYPE 2	*	FB	.0003	1.4S	EX-8912075	0173
1377-01-271-5485	AND GATE, TYPE 3	*	FB	.0003	1.4S	EX-8912076	0173
1377-01-271-7161	INITIATOR	1	FB	.0006	1.4C	EX-8808416	0276
1377-01-271-9072	EXPLOSIVE TRANSFER, ONE-WAY	*	FB	.0013	1.4S	EX-8809144A	0384
1377-01-272-4399	CABLE MECHANISM ASSY, STAGE I	1	FB	.0047	1.4S	EX-8807537	0070
1377-01-272-4400	CABLE MECHANISM ASSY, DM	1	FB	.0047	1.4S	EX-8807538	0070
1377-01-274-2394	CORD ASSY, DET	1	FB	.0013	1.4B	EX-8807539	0257
1377-01-274-5537	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807540	0367
1377-01-274-5538	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807541	0367
1377-01-274-5539	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807542	0367
1377-01-274-5540	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807543	0257
1377-01-274-5541	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807544	0257
1377-01-274-5542	CORD ASSY, DET	1	FB	.0007	1.4B	EX-8807545	0257
1377-01-274-5543	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807546	0257
1377-01-274-5544	CORD ASSY, DET	1	FB	.0018	1.4B	EX-8807547	0257
1377-01-274-5545	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807548	0367
1377-01-274-5546	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807549	0367
1377-01-274-9631	CORD ASSY, DET	1	FB	.0012	1.4B	EX-8807550	0257
1377-01-275-1658	EXPLOSIVE KIT E (F-111)	1	WB	.1610	1.4S	EX-8807551	0367
1377-01-275-1760	CORD ASSY, DET	1	FB	.0006	1.4B	EX-8807552	0257
1377-01-276-6496	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807553	0367
1377-01-276-6497	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807554	0367
1377-01-276-6498	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807555	0367
1377-01-276-6499	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807556	0367
1377-01-276-6500	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807557	0257
1377-01-276-7808	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807558	0367

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1377-01-276-7809	CORD ASSY, DET	1	FB	.0014	1.4B	EX-8807559	0257
1377-01-276-7810	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807560	0257
1377-01-277-1221	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807561	0367
1377-01-277-2868	CTG ASSY (AFSEAWARS)	*	FB	.0002	1.4S	EX-8807562	0349
1377-01-277-2869	CTG ASSY (AFSEAWARS)	*	FB	.0002	1.4S	EX-8807563	0349
1377-01-279-7177	CORD ASSY, DET	1	FB	.0009	1.4B	EX-8807564	0257
1377-01-279-7178	CORD ASSY, DET	1	FB	.0010	1.4B	EX-8807565	0257
1377-01-279-9506	CORD ASSY, DET	1	FB	.0011	1.4B	EX-8807566	0257
1377-01-281-4913	CORD ASSY, DET	1	FB	.0008	1.4B	EX-8807567	0257
1377-01-282-4676	CTG, IMPULSE, MK107 MOD 1	4	MB	.0569	1.4C	EX-8709238	0276
1377-01-283-6741	CTG, IMPULSE CCU-106/B	80	WB	.0234	1.4C	EX-8808417	0276
1377-01-284-1948	CTG, IMPULSE CCU-107/B	80	WB	.0100	1.4C	EX-8808418	0276
1377-01-285-3106	CORD ASSY, DET	1	FB	.0007	1.4B		0257
1377-01-287-4174	INITIATOR	1	FB	.0013	1.4C	EX-8808419	0276
1377-01-289-4632	INITIATOR	1	FB	.0013	1.4C	EX-8808420	0276
1377-01-290-1751	CTG, IMPULSE, CCU-91/B	4	MC	.0418	1.4C	EX-8709244	0276
1377-01-290-6883	CATAPULT, ROCKET	1	WB	12.7	1.3C	EX-8808348A	0186
1377-01-290-6884	CATAPULT, ROCKET	1	WB	12.7	1.3C	EX-8808341A	0186
1377-01-294-8911	SHOCK PROPAGATED CORD	*	FB	.0007	1.4S	EX-8807568	0367
1377-01-299-9862	ACTUATOR KIT	1	FB	.0018	1.4S	EX-8808421	0349
1377-01-314-5162	CORD ASSY, DET	1	FB	.0006	1.4S		0349
1377-01-314-5163	CORD ASSY, DET	1	FB	.0008	1.4S		0349
1377-01-314-5164	CORD ASSY, DET	1	FB	.0006	1.4S		0349
1377-01-314-5165	CORD ASSY, DET	1	FB	.0008	1.4S		0349
1377-01-318-1830	RKT MTR, VERNIER	1	WB	1.1	1.3C		0186
1377-01-318-7692	CORD ASSY, DET	1	FB	.0008	1.4S		0349
1377-01-318-7693	CORD ASSY, DET	1	FB	.0006	1.4S		0349
1377-01-318-7694	CORD ASSY, DET	1	FB	.0008	1.4S		0349
1377-01-318-7696	TIME DELAY INIT, 2.0 SEC	*	FB	.0077	1.4C		0276
1377-01-318-7697	TIME DELAY INIT, 1.5 SEC	*	FB	.0077	1.4C		0276
1377-01-319-3847	GAS GENERATOR, GYRO SPIN-UP	1	FB	.0111	1.4C		0276
1377-01-322-6334	CTG, MORTAR	1	FB	.0140	1.4C	EX-8808299	0276
1377-01-327-7872	RKT MTR, CANOPY JET	1	FB	.6879	1.3C	EX-8804111A	0186
1377-01-327-7873	RKT MTR, CANOPY JET	1	FB	.6879	1.3C	EX-8806174A	0186
1377-01-332-2379	CUTTER, REEFING LINE	1	FB	.0024	1.4S	EX-9209123	0070
1377-01-333-3503	CTG, ACFT FIRE EXTINGUISHER	1	FB	.0009	1.4S		0323
1377-01-340-3042	CATAPULT	1	WB	.2488	1.4C	EX-9209125	0276
1377-01-346-2215	INITIATOR	*	FB	.0033	1.4C	EX-8808731A	0276
1377-01-346-2216	INITIATOR	*	FB	.0044	1.4C	EX-8808535A	0276
1377-01-346-2217	INITIATOR	*	FB	.0066	1.4C	EX-8808285A	0276
1377-01-346-2218	INITIATOR	*	FB	.0066	1.4C	EX-8808285A	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR #RDS 3	SHIP CNTR TYPE 4	SHIP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1377-01-346-2219	INITIATOR, 1.0 SEC	1	FB	.0098	1.4C		0276
1377-01-346-2220	INITIATOR, .33 SEC	1	FB	.0098	1.4C		0276
1377-01-346-2221	INITIATOR, .40 SEC	1	FB	.0098	1.4C		0276
1377-01-360-4900	CTG, DELAY, 0.25 SEC	*	*	.0005	*1.4S		0012
1377-01-360-4901	CTG, DELAY, 0.5 SEC	*	*	.0005	*1.4S		0012
1377-01-360-4902	CTG, DELAY, 0.75 SEC	*	*	.0005	*1.4S		0012
1377-01-360-4903	CTG, DELAY, 1.0 SEC	*	*	.0005	*1.4S		0012
1377-01-360-4904	CTG, DELAY, 4.0 SEC	*	*	.0005	*1.4S		0012
1377-01-364-3955	CANOPY REMOVER, RAU-3/A	1	FB	.0500	1.4S		0323
1377-01-369-2492	CTG, IMPULSE, ARD863-1A1W	8	MC	.0090	1.4C		0276
1377-01-369-6045	CTG, IMPULSE, ARD446-1A1W	4	MC	.0276	1.4C		0276
1385-00-605-0253	CTG, IMPULSE	12	MB	.0243	1.4C	EX-8908009	0276
1385-00-896-3694	CTG, IMPULSE	84	MB	.0243	1.4C	EX-8805909	0276
1390-00-187-5392	FUZE, POINT DET M557	16	WC	.0300	1.1B	EX-8811948	0106
1390-00-764-9124	FUZE, PROX, M532	16	WC	.0176	1.1B	EX-8805945	0106
1390-00-892-4302	FUZE, POINT DET	16	WC	.0300	1.1B	EX-8805953	0106
1390-00-980-0494	PRIMER, ELEC	N/A	N/A	.0004	1.4B	EX-8010018	0378
1390-01-054-1527	PRIMER, M42-5086	N/A	N/A	N/A	1.4B	EX-8808423	0378
1390-01-054-5137	PRIMER, M92A1	112	FB	.0003	1.4S	EX-8709255	0044
1410-00-125-6760	MSL, AGM-65B	1	*	85.0	1.1E	EX-8808424	0181
1410-00-138-2910	AGM-65/A	1	*	85.0	1.1E	EX-8808426	0181
1410-00-196-6099	AIM-4A/D	1	MB	2.5	(04)1.2E	EX-8808427	0182
1410-00-196-6100	AIM-4F	1	MB	5.0	(04)1.2E	EX-8808428	0182
1410-00-196-6101	AIM-4G	1	MB	5.0	(04)1.2E	EX-8808429	0182
1410-00-196-6103	AIM-4A/D	1	MB	2.5	(04)1.2E	EX-8808430	0182
1410-00-196-6104	AIM-4A/D-2	1	MB	2.5	(04)1.2E	EX-8808431	0182
1410-00-196-6105	AIM-4A/D-9	1	MB	2.5	(04)1.2E	EX-8808432	0182
1410-00-238-1486	AGM-65/A	1	*	85.0	1.1E	EX-8808433	0181
1410-00-480-1933	MSL, AGM-78C-3	1	MB	674.0	1.1E	EX-8808434	0181
1410-00-480-1938	MSL,AGM-78C-2	1	MB	674.0	1.1E	EX-8808435	0181
1410-00-480-1939	MSL,AGM-78B-3	1	MB	674.0	1.1E	EX-8808436	0181
1410-00-557-4475	MSL, AGM-45A-6	4	MB	143.5	1.1E	EX-8712534	0181
1410-00-731-7373	MSL, AGM-45A-3B	4	MB	143.5	1.1E	EX-8712537	0181
1410-01-089-2505	MSL, AGM-65/B	1	*	85.0	1.1E	EX-8807570	0181
1410-01-094-0215	MSL, AGM-65/B, INERT WARHEAD	1	*	65.0	1.3C	EX-8808437	0183
1410-01-094-0216	MSL, AGM-65/A, INERT WARHEAD	1	*	65.0	1.3C	EX-8808438	0183
1410-01-101-8237	MSL, AIM-7F AUR	4	MB	26.1	(07)1.1E	EX-8807571	0181
1410-01-101-8490JE	MSL, AGM-65A	1	*	85.0	1.1E	EX-8808439	0181
1410-01-135-2771	MSL, AIM-9L AUR	4	MB	7.4	(04)1.1E	EX-8807572	0181
1410-01-135-6176	MSL, AIM-7E3 AUR	4	MB	20.2	(07)1.1E	EX-8807573	0181
1410-01-137-5971	MSL, AIM-9E2 AUR	4	MB	10.5	(04)1.1E	EX-8807574	0181

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1410-01-137-5972	MSL, AIM-9P3 AUR	4	MB	10.5	(04)1.1E	EX-8807575	0181
1410-01-158-2873	MSL, AGM-65D	1	FC	85.0	1.1E	EX-8503031	0181
1410-01-162-9395	MSL, AIM-9M AUR	4	MB	7.4	(04)1.1E	EX-8807576	0181
1410-01-168-0339	MSL, ATM-84C-1	2	MB	1.4	1.4J	EX-8709403	0276
1410-01-168-3591	MSL, AIM-7M AUR (WAU-17W/H)	4	MB	36.0	(04)1.1E	EX-8807577	0181
1410-01-168-3592	MSL, AIM-7M (WAU-10 W/H)	4	MB	26.1	(07)1.1E	EX-8807578	0181
1410-01-168-8663	MSL, AGM-88A AUR	2	MB	45.2	(04)1.2E	EX-8709404	0182
1410-01-169-3113	MSL, AGM-84C-1	2	MB	215.0	1.1J	EX-8709405	0397
1410-01-181-2268	MSL, ATM-84D-1	2	MB	1.4	1.4J	EX-8709419	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1410-01-190-0629	MSL, AGM-45A-4	4	MB	60.0	1.1E	EX-9204001	0181
1410-01-190-0630	MSL, AGM-45A-6	4	MB	60.0	1.1E	EX-9204001A	0181
1410-01-190-0632	MSL, AGM-45B-3	4	MB	60.0	1.1E	EX-9204001B	0181
1410-01-190-0634	MSL, AGM-45B-4	4	MB	60.0	1.1E	EX-9204001E	0181
1410-01-190-0635	MSL, AGM-45B-6	4	MB	60.0	1.1E	EX-9204001C	0181
1410-01-192-6037	MSL, AGM-45A-3B	4	MB	60.0	1.1E	EX-9204001D	0181
1410-01-230-0168	MSL, AGM-45A-2	4	MB	60.0	1.1E	EX-9204001F	0181
1410-01-230-0169	MSL, AGM-45A-9	4	MB	60.0	1.1E	EX-9204001G	0181
1410-01-230-0170	MSL, AGM-45A-9A	4	MB	60.0	1.1E	EX-9204001H	0181
1410-01-230-0171	MSL, AGM-45A-10	4	MB	60.0	1.1E	EX-9204001I	0181
1410-01-230-0172	MSL, AGM-45B-9	4	MB	60.0	1.1E	EX-9204001J	0181
1410-01-230-0173	MSL, AGM-45B-9A	4	MB	60.0	1.1E	EX-9204001K	0181
1410-01-230-0174	MSL, AGM-45B-10	4	MB	60.0	1.1E	EX-9204001L	0181
1410-01-230-0175	MSL, AGM-45B-2	4	MB	60.0	1.1E	EX-9204001M	0181
1410-01-230-5083	MSL, AGM-45A-3 OR -3A	4	MB	60.0	1.1E	EX-9204001N	0181
1410-01-230-5084	MSL, AGM-45B-3B	4	MB	60.0	1.1E	EX-9204001O	0181
1410-01-237-4083	MSL, AGM-88 AUR	2	MB	45.2	(04)1.2E	EX-8807579	0182
1410-01-242-4880	MSL, AGM-88 AUR	2	MB	45.2	(04)1.2E	EX-8807580	0182
1410-01-247-0635	MSL, AGM-88 AUR	2	MB	45.2	(04)1.2E	EX-8807581	0182
1410-01-247-0636	MSL, AGM-88 AUR	2	MB	45.2	(04)1.2E	EX-8807582	0182
1410-01-247-0637	MSL, AGM-88 AUR	2	MB	45.2	(04)1.2E	EX-8807583	0182
1410-01-247-0638	MSL, AGM-88 AUR	2	MB	45.2	(04)1.2E	EX-8807584	0182
1410-01-285-0603	MSL, AGM-65D	1	MB	85.0	1.1E	EX-8808440	0181
1410-01-301-3317	MSL, AIM-120 AMRAAM	4	MB	29.0	(08)1.2E	EX-9011025	0182
1410-01-308-3788	MSL, AIM-7M (H-BLD) (WAU-17 W/HI)	4	MB	36.0	(04)1.1E		0181
1410-01-308-3789	MSL, AIM-7M (H-BLD) (WAU-10 W/HI)	4	MB	26.1	(07)1.1E		0181
1410-01-317-3203	MISSILE, AGM-88	2	MB	45.2	(04)1.2E	EX-8807584	0182
1410-01-317-3204	MISSILE, AGM-88	2	MB	45.2	(04)1.2E	EX-8807584	0182
1410-01-319-5041	MISSILE, CATM-9L-3	4	MB	.0360	1.4C	EX-8808479A	0276
1410-01-319-5043	MISSILE, CATM-9M-3	4	MB	.0360	1.4C	EX-8712654A	0276
1410-01-319-5044	MISSILE, CATM-9M-9	4	MB	.0360	1.4C	EX-8712654B	0276
1410-01-319-9614	MISSILE, CATM-9L-9	4	MB	.0360	1.4C	EX-8808479B	0276
1410-01-331-5483	MSL, AIM-9M-7	4	MB	7.4	(04)1.1E	EX-8807576	0181
1410-01-320-7531	MISSILE, AGM-120A AMRAAM	4	MB	29.0	(08)1.2E		0182
1420-00-003-7274	PSR	1	MB	.0097	1.3L	EX-8808441	0250
1420-00-050-1789	PARTS KIT, AIM-4D	1	FB	.0020	(M) 2.2S	EX-8808442	1066
1420-00-066-1558	CONT SECT, AGM-45A	1	MB	1.4	1.4C	EX-8808443	0276
1420-00-105-6390	GAS GEN, MK7 MOD 1	24	MB	.7400	1.4C	EX-8805971	0276
1420-00-137-7159	HYD PWR SUPPLY	1	FB	.0003	(M) 2.2S	EX-8808444	1046
1420-00-137-7160	HYD PWR SUPPLY	1	FB	.0003	(M) 2.2S	EX-8808445	1046

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1420-00-165-4626	BOOSTER SECT, AGM-69/A	1	WB	1000	1.3C	EX-8808446	0186
1420-00-167-8393	GUID UNIT	1	FB	.0020	(M) 2.2S	EX-8808447	1006
1420-00-372-5264	CONT SECT, MOD 2	*	MB	1.4	1.4C	EX-8808448	0276
1420-00-450-8183	PSRE	1	MB	.0097	1.3L	EX-8808449	0250
1420-00-473-5259	GUID UNIT	1	FB	.0020	(M) 2.2S	EX-8808450	1006
1420-00-484-9306	CONT SECT, MK5 MOD 1	*	MB	1.4	1.4C	EX-8808451	0276
1420-00-724-8153	PWR PLANT, MK6A	1	FB	.6656	1.4C	EX-8808452	0276
1420-00-831-0521	PWR PLANT, MK6A	1	FB	.6656	1.4C	EX-8808453	0276
1420-00-908-8253	GUID UNIT, AIM-4D	1	MB	.0020	(M) 2.2S	EX-8808454	1006
1420-00-955-6156	GUID UNIT, AIM-4D	1	FB	.0020	(M) 2.2S	EX-8808455	1006
1420-00-994-2146	GUID UNIT, AIM-4D/G	1	FB	.0020	(M) 2.2S	EX-8808456	1006
1420-01-005-3957	TGT DET DEVICE, DSU-15/B	4	MB	.0039	1.4S	EX-8708384	0349
1420-01-005-5849	FLT CONTROL ACTR ASSY	1	WB	.0017	(M) 2.2S	EX-8808457	1046
1420-01-005-6235	HELIUM STOR BOTTLE, AGM-69/A	1	FB	.0017	(M) 2.2S	EX-8808458	1046
1420-01-017-1701	SPACER, PENETRATION AID	1	MB	.0178	1.4C	EX-8808459	0276
1420-01-052-1606	SERVO SECTION	1	FB	.7717	1.4C	EX-8808460	0276
1420-01-098-9610	GUID SECT, MK 49 MOD 1	1	MB	.0007	1.4S	EX-8708400	0349
1420-01-098-9615	CONT SECT, MK 5 MOD 3	*	MB	1.4	1.4C	EX-8808461	0276
1420-01-101-8233	TGT DET DEVICE, DSU-15A/B	4	MB	.0039	1.4S	EX-8708401	0349
1420-01-119-4589	VALVE ASSY	*	FB	.0005	1.4S		0323
1420-01-149-3510	CONTROL SECTION, WCU-5/B, A/B	1	MB	.0007	1.4S	EX-8708420	0323
1420-01-161-2090	CONTROL MODULE WCU-2/B	1	MB	.0044	1.4S	EX-8708421	0323
1420-01-183-7498	TANK HOUSING & SERVO ASSY	1	FB	.7717	1.4C	EX-8808463	0276
1420-01-170-1415	COMPUTER GP WCU-10/B	1	MB	.9610	1.4C	EX-8708428	0276
1420-01-200-5145	IN-FLIGHT COOLANT ASSY	1	WB	.0036	(M) 2.2S	EX-8807585	1078
1420-01-205-8311	AFT SHROUD STRUCTURE ASSY	1	WB	.0505	1.4C	EX-8807586	0351
1420-01-241-5790	CONTROL SECTION WCU-2/B	1	MB	.0044	1.4S	EX-8708459	0349
1425-01-024-9982	MSL, STINGER, FIM-92A	1	MB	.8500	1.1E	EX-8912138	0181
1427-00-326-3308	GUID & CONT SECT, AIM-7E	1	MB	1.6	(M) 2.2S	EX-8806179	1046
1427-00-442-1654	GUID & CONT UNIT, AIM-9J	2	MB	.7400	1.4C	EX-8808464	0276
1427-00-603-5439	GUID & CONT, AIM-9J	2	MB	.7400	1.4C	EX-8808466	0276
1427-00-782-9763	GUID & CONT, AIM-7	1	MB	1.6	(M) 2.2S	EX-8808469	1046
1427-00-786-1266	GUID & CONT, AIM-7	1	MB	.7500	(M) 2.2S	EX-8808470	1046
1427-00-874-5760	GUID & CONT, AIM-9B	1	MB	.5500	1.4C	EX-8808471	0276
1427-00-938-2394	GUID & CONT, AIM-9B/E	2	MB	.5500	1.4C	EX-8808472	0276
1427-01-005-4003	GUID & CONT SECT, AIM-7F-5	1	MB	.0767	(M) 2.2S	EX-8808473	1046
1427-01-006-0523	GUID & CONT SECT, AIM-7F	1	MB	.0767	(M) 2.2S	EX-8808474	1046
1427-01-006-0524	GUID & CONT SECT, AIM-7F-4	1	MB	.0767	(M) 2.2S	EX-8808475	1046
1427-01-015-8956AB	GUID & CONT UNIT, AIM-9	2	MB	.5500	1.4C	EX-8808476	0276

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
1427-01-022-0113	GUID & CONT UNIT SECT, AIM-7F-5	1	MB	.0750	(M) 2.2S	EX-8808477	1046
1427-01-024-9967	MSL, STINGER, FIM-92A	1	MB	.8500	1.1E	EX-9002622	0181
1427-01-034-3406	GUID & CONT UNIT	1	MB	.0750	(M) 2.2S	EX-8808478	1046
1427-01-041-8459	GUID & CONT UNIT	2/4	MB	.0360	1.4C	EX-8808479	0276
1427-01-049-5498	GUID & CONT UNIT	1	MB	.0750	(M) 2.2S	EX-8808480	1046
1427-01-068-3184	GUID & CONT UNIT	1	MB	.0750	(M) 2.2S	EX-8808481	1046
1427-01-071-8399	GUID & CONT UNIT, AIM-9P	1	MB	.7400	1.4C	EX-8808482	0276
1427-01-072-3601	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	EX-8708510	1046
1427-01-072-3603	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	EX-8708512	1046
1427-01-093-7405	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	EX-8708515	0323
1427-01-093-7406	GUID & CONT, AIM-7F	1	MB	.0767	1.4S	EX-8708516	0323
1427-01-104-3011	GUID & CONT SECT	2	MB	.7400	1.4C	EX-8808483	0276
1427-01-104-3012	GUID & CONT SECT	2	MB	.7400	1.4C	EX-8808484	0276
1427-01-114-2054	GUID & CONT UNIT, WGU-4A/B	2/4	MB	.0360	1.4C	EX-8712654	0276
1427-01-133-7443	TGT SEEKER, RADOME	1	MB	.0136	1.4S	EX-8708521	0323
1427-01-133-7467	GUID & CONT, AIM-7M	1	MB	.0750	(M) 2.2S	EX-8808485	1046
1427-01-133-7468	GUID & CONT, AIM-7M	1	MB	.0750	(M) 2.2S	EX-8808486	1046
1427-01-134-0919	FLT CONT GP, OA-8878D/D	1	MB	.0070	1.4S	EX-8708524	0349
1427-01-140-8514	GUID & CONT, AIM-9P	2	MB	.7400	1.4C	EX-8808487	0276
1427-01-140-8515	GUID & CONT, AIM-9P	2	MB	.7400	1.4C	EX-8808488	0276
1427-01-149-3504	GUID & RADOME ASSY	1	MB	.0133	1.4S	EX-8708526	0349
1427-01-276-0428	GUID & CONT, AIM-7M(H)	1	MB	.0750	(M) 2.2S	EX-8808489	1046
1427-01-281-5623	STAGE IV (MX)	1	MB	.1855	1.3L	EX-8807587	0250
1427-01-329-6322	GUID & CONT UNIT WGU-4D/B	2/4	MB	.0360	1.4C	EX-8712654	0276
1560-00-215-2116	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808490	1066
1560-00-215-2119	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808491	1066
1560-00-215-2120	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808492	1066
1560-00-215-2121	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808493	1066
1560-00-835-1326	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808494	1066
1560-00-835-1337	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808495	1066
1560-00-835-1356	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808496	1066
1560-00-835-1533	PRESSURE SOURCE, F-111	1	FB	.0001	(M) 2.2S	EX-8808497	1066
1560-01-042-3217	CANOPY ASSY	1	WB	.0250	1.4S	EX-8808498	0349
1560-01-086-1328	CANOPY ASSY	1	WB	.0230	1.4S	EX-8808499	0349
1560-01-147-1526	CANOPY ASSY	1	WB	.0250	1.4S	EX-8808500	0349
1560-01-147-1527	CANOPY ASSY	1	WB	.0230	1.4S	EX-8808501	0349
1560-01-163-1733	CANOPY ASSY	1	WB	.0230	1.4S	EX-8808502	0349
1560-01-164-6510	CANOPY ASSY	1	WB	.0230	1.4S	EX-8808499A	0349
1560-01-165-2041	CANOPY ASSY	1	WB	.0230	1.4S	EX-8808503	0349
1560-01-167-5199	CANOPY ASSY	1	WB	.0250	1.4S	EX-8808504	0349
1560-01-168-3575	CANOPY ASSY	1	WB	.0250	1.4S	EX-8808505	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR #RDS 3	SHIP CNTR TYPE 4	SHIP CNTR NEW 5	IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
1660-00-236-2037	CANDLE, OXY GEN ASSY, C-5A (E)	1	FB	1.2	(I) 5.1G	EX-8808506	1495
1660-00-431-7644	GEN ASSY, OXY, C-5A (E)	1	FB	1.2	(I) 5.1G	EX-8808507	1495
1670-00-079-0983	DRAG PARA ASSY (MARS)	1	MB	.0078	1.4S	EX-8808508	0349
1670-00-204-5759	PARA ASSY, F-111	1	WC	.0027	1.4S	EX-8808509	0349
1670-00-406-5715	MK8A, PARA ASSY	1	FB	.0003	1.4S	EX-8808510	0349
1670-00-432-9991	PARA ASSY	1	MB	.0362	1.4S	EX-8808511	0349
1670-00-448-3968	MAIN RECOVERY PARA	1	MB	.0362	1.4S	EX-8808512	0349
1670-00-459-7659	ENGAGEMENT PARA	1	MB	.0078	1.4S	EX-8808513	0349
1670-01-040-8490	MID-AIR RECOVERY PARA	1	FB	.0298	1.4S	EX-8808515	0349
1670-01-059-8149	MID-AIR RETRIEVAL PARA SYS	N/A	N/A	.0288	1.4S	EX-8808516	0349
1670-01-077-1300	MID-AIR RETRIEVAL PARA SYS	N/A	N/A	N/A	1.4S		0349
1670-01-140-8634	PARACHUTE, FLIGHT TERM AGM-86	1	WB	.0152	1.4C	EX-8807588	0276
1670-01-149-7547	PARACHUTE, RECOVERY AGM-86	1	WB	.0197	1.4C	EX-8807589	0276
1670-01-180-5593	PARACHUTE, TRAINER AGM-86	1	FB	.0013	1.4C	EX-8807590	0276
1670-01-180-5594	PARACHUTE, TRAINER AGM-86	1	FB	.0013	1.4C	EX-8807591	0276
1670-01-180-5595	MID-AIR RECOVERY SYS AGM-86	1	FB	.0004	1.4C	EX-8807592	0276
1670-01-180-5900	MID-AIR RECOVERY SYS AGM-86	1	FB	.0004	1.4C	EX-8807593	0276
1680-01-053-8604LS	RECOVERY SEQUENCER ASSY	N/A	N/A	N/A	1.4S	EX-8807594	0323
1680-01-053-9320LS	RECOVERY SEQUENCER ASSY	N/A	N/A	N/A	1.4S	EX-8807595	0323
1820-00-242-1418	FWD SECT PAYLOAD, LGM-30	1	WB	.0362	1.4C	EX-8808517	0276
1820-00-242-1419	AFT SECT PAYLOAD, LGM-30	1	MB	.1075	1.4C	EX-8808518	0276
1820-01-142-6596	AFT SECT PAYLOAD, LGM-30	1	MB	.1075	1.4C		0276
2845-00-406-5844	FUEL TANK W/ISO VALVE	1	MB	N/A	(J) **6.1	EX-8808520	1244
2845-00-406-5845	OXY TANK W/ISO VALVE	1	MB	N/A	(K) *2.3	EX-8808521	1067
2915-00-893-2389	CYL, GAS, ETHYLENE OXIDE	1	WB	2.0	(L) ***3	EX-8808522	2983
2915-01-120-1885	VALVE, SERVICE	*	FB	.0009	1.4S		0323
4210-00-880-3815	ELEC DISCHARGE PLUG	1	FB	.0016	1.4S	EX-8808523	0349
5320-00-543-2942	EXPL RIVETS	500	FB	.0002	1.4S	EX-8808524	0174
5320-00-619-3706	EXPL RIVETS	1000	FB	.0002	1.4S	EX-8808525	0174
5320-00-619-3794	EXPL RIVETS	500	FB	.0002	1.4S	EX-8808526	0174
6130-00-493-6629CM	POWER SUPPLY, MK12 RV	10	FB	.0810	(A) 8L	EX-8808527	2794
6130-01-113-1265CM	POWER SUPPLY, ARMING & FUZING	12	FB	.0010	(A) 8L	EX-8807597	2796
6130-01-195-0891CM	POWER SUPPLY, ARMING & FUZING	12	FB	.0010	(A) 8L	EX-8807597	2794
6130-01-293-4146CM	POWER SUPPLY, ARMING & FUZING	12	FB	.0010	(A) 8L		2794
6135-00-009-4100	BATTERY	*	*	.0001	1.4S	EX-8808528	0349
6135-00-056-6863	BATTERY, ELEC	1	FB	.0019	(A) 8S	EX-8808529	2794
6135-00-063-7757	BATTERY	1	FB	.0001	(A) 8S	EX-8808530	2794
6135-00-166-9288	PWR SUPPLY	1	FB	.0386	(A) 8S	EX-8808531	2794
6135-00-416-2898	BATTERY	*	*	.0001	(A) 8S	EX-8808533	2794
6135-00-426-2386	BATTERY	1	FB	.0002	1.4S	EX-8808534	0349
6135-00-435-1120	BATTERY	1	*	.0001	1.4S	EX-8808535	0349

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
6135-00-437-5182	BATTERY	1	MC	.0087	(A) 8S	EX-8808536	2794
6135-00-488-4478	BATTERY	1	FB	.0001	1.4S	EX-8808537	0349
6135-00-572-5908	BATTERY	N/A	N/A	.0004	1.4S	EX-8808538	0349
6135-00-655-2279	BATTERY	N/A	N/A	.0001	1.4S	EX-8808542	0349
6135-00-691-2442CM	ATTITUDE CONT BATTERY	*	*	.0004	(A) 8S	EX-8808544	2794
6135-00-789-2865	BATTERY	1	FB	.0001	(A) 8S	EX-8808548	2794
6135-00-793-1809XJ	BATTERY	N/A	N/A	N/A	1.4S	EX-8808549	0349
6135-00-819-8073	BATTERY	1	MC	.0001	(A) 8S	EX-8808550	2794
6135-00-819-8074	BATTERY	1	MC	.0001	(A) 8S	EX-8808551	2794
6135-00-824-2772AQ	BATTERY	N/A	N/A	.0001	1.4S	EX-8808553	0349
6135-00-883-8793AQ	BATTERY	1	FB	.0022	1.4S	EX-8808555	0349
6135-00-992-8750	BATTERY	N/A	N/A	.0072	(A) 8S	EX-8808566	2794
6135-00-994-5021	BATTERY	N/A	N/A	.0004	(A) 8S	EX-8808567	2794
6135-01-013-8794JB	THERMAL BATTERY	1	FB	.0002	1.4S	EX-8808568	0349
6135-01-033-3213	BATTERY	15	MB	.0001	1.4S	EX-8808569	0349
6135-01-054-2462	BATTERY, THERMAL	1	FB	.0002	1.4S	EX-8807598	0349
6135-01-110-8022	BATTERY, WET, PRIMARY, BA2025/DWW	N/A	N/A	N/A	(A) 8L	EX-8807599	2795
6135-01-124-4150	BATTERY	*	FB	1.58	1.4S		0349
6135-01-183-8993	BATTERY, THERMAL	15	MB	.0016	1.4S	EX-8807600	0349
6135-01-185-1057	BATTERY, THERMAL (CMA)	*	WB	.0001	1.4S	EX-8808570	0349
6135-01-186-2891	THERMAL BATTERY	4	FB	.2032	1.4S	EX-8604183	0349
6135-01-200-5143	ORDNANCE BATTERY P470	1	FB	.0036	(A) 8S	EX-8808089	1814
6135-01-200-5144	ELECTRONICS BATTERY P471	1	FB	.0041	(A) 8S	EX-8808090	1814
6135-01-218-0433CM	MK21 FUZE BATTERY	1	FB	.0007	(A) 8S	EX-8808087	1814
6135-01-226-6730CM	THERMAL BATTERY POWER SUPPLY	1	FB	.0002	1.4S	EX-8808086	0349
6135-01-247-4300	BATTERY, PRIMARY	120	FB	.0001	1.4S		0349
6135-01-260-1099	IFSS BATTERY (2AH)	1	MB	.0060	(A) 8S	EX-8807601	1814
6135-01-260-1100	IFSS BATTERY (8AH)	1	MB	.0133	(A) 8S	EX-8807602	1814
6350-00-169-1552	SIGNAL PROCESSOR, TC521	1	FB	.0001	1.4S	EX-8808574	0349
6350-00-169-1558	SIGNAL PROCESSOR, TC466	1	FB	.0001	1.4S	EX-8808575	0349
6350-00-169-1559	SIGNAL PROCESSOR, TC472	1	FB	.0001	1.4S	EX-8808576	0349
6695-01-248-9833	BATTERY INDICATOR	150	FB	.0001	1.4S		0173
6920-00-071-5078	GUID MSL TNG, AGM-45A	1	MB	91.7	(08)1.2E	EX-8808577	0182
6920-00-919-5786	GUIDE MSL TNG, AGM-45A	1	MB	.7500	1.4C	EX-8808578	0276
6920-01-166-8374	TGM-65D MISSILE	1	MB	.0001	(M) 2.2S	EX-8808579	1046
6920-01-238-0123	TGM-65E MISSILE	1	MB	.0001	(M) 2.2S	EX-8808580	1046
6920-01-239-0525	TGM-65D MISSILE	1	MB	.0001	(M) 2.2S	EX-8808581	1046
6920-01-285-1264	TGM-65G MISSILE W/O VTRA	1	MB	.0001	(M) 2.2S	EX-8808582	1046
6920-01-285-1265	TGM-65G MISSILE W/VTRA	1	MB	.0001	(M) 2.2S	EX-8808583	1046
6920-01-286-1489	TGM-65D MISSILE	1	MB	.0001	(M) 2.2S	EX-8808584	1046
6920-01-286-1490	TGM-65D MISSILE	1	MB	.0001	(M) 2.2S	EX-8808585	1046

Table 3-2. UN Explosive Hazard Classification (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHIP CNTR			IBD/ CLASS/ DIV/SCGP LABEL 6	DOT CONT NO. 7	UN SER NO. & MKG 8
		#RDS 3	TYPE 4	NEW 5			
8475-01-294-5332	RELEASE SYS, MASK	*	FB	.0001	1.4S	EX-8807603	0349

*U.S. Government Printing Office: 1993 — 774-084/82021

Table 3-1. Explosive Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1375-00-028-5226	CAP, BLASTING	5000	WB	.0020	1.1B	A	FA	A	0029
1375-00-028-5228	CAP, BLASTING	*	*	.0020	1.1B	A	FA	A	0029
1375-00-028-5237	CHG, DEMOLITION, M2A3	3	WB	11.5	1.1D	A	BT	A	0048
1375-00-028-5241	CHG, DEMOLITION	1	WB	30.0	1.1D	A	BT	A	0048
1375-00-028-5245	CHG, DEMOLITION, M37	2	WB	20.0	1.1D	A	BT	A	0048
1375-00-028-5246	FUSE, BLASTING, TIME	80	WB	.3500	1.4S	C	CZ	C	0105
1375-00-028-5247	DEMOLITION KIT, M1A1	1	WB	89.2	1.1D	A	BF	A	0034
1375-00-041-1312	CAP, BLASTING, E81	50	MB	.0020	1.4B	C	FB	C	0255
1375-00-062-7313	BOOSTER, CORD, DET	1	FB	.0024	1.1B	A	FA	A	0225
1375-00-074-3196	CAP, BLASTING	*	*	.0005	1.4B	C	FB	C	0255
1375-00-077-3390	INITIATOR	1	MB	.0065	1.4B	C	BB	C	0257
1375-00-078-0450	DOCUMENT DEST (DE)	1	MC	212.2	1.3G	B	CK	B	0010
1375-00-078-4295	CORD, DET	100	WB	.0143	1.1D	A	YQ	A	0065
1375-00-088-6691	CHG, DEMOLITION	1	WB	30.0	1.1D	A	BT	A	0048
1375-00-096-3095	DYNAMITE	100	WB	.5000	1.1D	A	BT	A	0081
1375-00-096-3098	DYNAMITE	211	WB	.5000	1.1D	A	BT	A	0081
1375-00-096-3099	DYNAMITE	100	WB	.5000	1.1D	A	BT	A	0081
1375-00-096-3100	DYNAMITE	100	WB	4.6	1.1D	A	BT	A	0081
1375-00-180-9356	CORD, DET	3	WB	7.0	1.1D	A	YQ	A	0065
1375-00-204-0851	CORD, DET	3	WB	7.0	1.1D	A	YQ	A	0065
1375-00-219-8562	CRYPTO, EQUIP, DEST, M1A1, TH (DE)	1	WB	28.0	1.3G	B	DH	B	0010
1375-00-219-8563	CRYPTO, EQUIP, DEST, M2A1, TH (DE)	2	WB	8.5	1.3G	B	DH	B	0010
1375-00-219-8564	FILE, DEST, M4 (DE)	1	WB	76.0	1.3G	B	CK	B	0010
1375-00-327-6759	CAP, BLASTING	1	FB	.0005	1.4B	C	FB	C	0365
1375-00-383-3908	CRYPTO EQUIP, DEST, M1A2, TH (DE)	1	WB	28.0	1.3G	B	DH	B	0010
1375-00-482-2053	DESTRUCTOR, INITIATOR	1	WB	.2900	1.1D	A	AQ	A	0043
1375-00-516-9927	CAP, BLASTING	*	WB	.0003	1.1B	A	FA	A	0030
1375-00-529-8004	DOCUMENT DEST, M3 (DE)	1	WB	100.0	1.3G	B	CK	B	0010
1375-00-542-0090	DOCUMENT DEST, M3 (DE)	1	WB	100.0	1.3G	B	CK	B	0010
1375-00-580-1392	FIRING DEVICE	200	WB	.0001	1.4S	C	CF	C	0349
1375-00-691-1671	IGNITER, TIME, BLASTING	300	WB	.0001	1.4S	C	BQ	C	0131
1375-00-699-5236	COUPLING BASE, FIRING	N/A	N/A	.0001	1.4S	C	CE	C	0044
1375-00-707-3044	CAP, BLASTING	100	WB	.0005	1.4B	C	FB	C	0365
1375-00-724-7040	CHG, DEMOLITION	30	WB	1.25	1.1D	A	BT	A	0048
1375-00-724-9613	DYNAMITE MILITARY, M1	100	WB	.3900	1.1D	A	BT	A	0082
1375-00-728-5941	CHG, DEMOLITION	20	WB	2.0	1.1D	A	BT	A	0048
1375-00-728-7762	CHG, DEMOLITION	6	WC	.3216	1.1D	A	BT	A	0048
1375-00-756-1864	CAP, BLASTING	600	WB	.0027	1.1B	A	FA	A	0029
1375-00-756-1865	CAP, BLASTING	900	WB	.0019	1.1B	A	FA	A	0030
1375-00-772-1369	PROPELLANT, IMR4350	*	*	1.0	1.3C	B	CK	B	0161
1375-00-772-1370	PROPELLANT, IMR4064	*	*	1.0	1.3C	B	CK	B	0161

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2		SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1370-01-160-9174	SIMULATOR, IR FLARE SD-206		60	WB	.0783	1.4G	C	DG	C	0197
1370-01-162-4199	SIMULATOR, IR FLARE SD-007		60	WB	.0783	1.4G	C	DG	C	0197
1370-01-167-9561	SIMULATOR, IR FLARE SD-002		26	WB	.0812	1.4G	C	DG	C	0197
1370-01-180-5856	PROJECTILE, AIRBURST PJU-7/E		48	WB	.4850	1.1G	A	BF	A	0049
1370-01-181-1336	LAUNCH CHARGE, CCK-77/E		49	WB	.0045	1.4C	C	EA	C	0276
1370-01-187-8390	FLARE, MJU-7/B	(E)	15	WB	.6278	1.3G	B	DH	B	0093
1370-01-204-1525	CTG, BIRDSCARE, 12 GAGE, PGU-26P		500	FB	.0059	1.4S	C	DC	OO	0012
1370-01-209-8783	FLARE, ALA-17B	(E)	8	WB	2.8	1.3G	B	DH	B	0093
1370-01-234-0718	CTG, CHAFF RR-141E/AL		56	WB	.0004	1.4S	C	BJ	C	0173
1370-01-254-3481	SIMULATOR, FLARE MJU-2(T-1)/B		26	WB	.0812	1.4G	C	DG	C	0197
1370-01-254-3482	SIMULATOR, FLARE MJU-7(T-1)/B		60	WB	.0783	1.4G	C	DG	C	0197
1370-01-254-3483	SIMULATOR, FLARE M206(T-1)		60	WB	.0783	1.4G	C	DG	C	0197
1370-01-257-8901	FLARE, MJU-23/B	(E)	12	WB	2.7	1.3G	B	DH	B	0093
1370-01-263-1602	FLARE IR, MJU-10/B	(E)	24	WB	2.0	1.3G	B	DH	B	0093
1370-01-279-9505	PROJECTILE, AIRBURST PJU-7A/E		48	WB	.4850	1.3G	B	DH	B	0335
1370-01-284-5619	SIGNAL, SMOKE, MK 6 MOD 5		4	WB	4.0	1.3G	B	DH	B	0254
1370-01-296-8395	FLARE, MJU-7A/B	(E)	15	WB	.6278	1.3G	B	DH	B	0093
1370-01-299-6008	FLARE, IR, W112/B		80	WB	.2700	1.3G	B	DH	B	0093
1370-01-325-4959	SIMULATOR, IR FLARE MJU-10(T-1)/B		24	WB	.0783	1.4G	C	DG	C	0197
1370-01-331-2545	SIMULATOR, FLARE MJU-2(T-2)/B		26	WB	.0812	1.4G	C	DG	C	0197
1370-01-331-2546	SIMULATOR, FLARE M206(T-2)		60	WB	.0783	1.4G	C	DG	C	0197
1370-01-331-2547	SIMULATOR, FLARE MJU-7(T-2)/B		60	WB	.0783	1.4G	C	DG	C	0197
1370-01-331-3485	FLARE, LUU-2B/B	(E)	4	WB	22.0	1.3G	B	DH	B	0093
1370-01-335-5053	FLARE, LUU-4/B	(E)	4	WB	12.3	1.3G	B	DH	B	0093
1370-01-335-6074	FLARE, LUU-5/B	(E)	4	WB	16.0	1.3G	B	DH	B	0093
1370-01-335-6075	FLARE, LUU-1/B	(E)	4	WB	16.0	1.3G	B	DH	B	0093
1375-00-028-5140	CHG, DEMOLITION		96	WB	.5000	1.1D	A	BT	A	0048
1375-00-028-5142	CHG, DEMOLITION		48	WB	1.0	1.1D	A	BT	A	0048
1375-00-028-5145	CHG, DEMOLITION		1	WB	40.0	1.1D	A	BT	A	0048
1375-00-028-5148	CHG DEMOLITION		24	WB	2.5	1.1D	A	BT	A	0048
1375-00-028-5151	FUSE, BLASTING, TIME		80	WB	.3500	1.4S	C	CZ	C	0105
1375-00-028-5161	CORD, DET		50	WB	.0600	1.1D	A	YQ	A	0065
1375-00-028-5168	CORD, DET		8	WB	3.5	1.1D	A	YQ	A	0065
1375-00-028-5180	FIRING DEVICE, M1A1		250	WB	.0001	1.4S	C	CF	C	0349
1375-00-028-5187	FIRING DEVICE, M1		80	WB	.0001	1.4S	C	CF	C	0349
1375-00-028-5189	FIRING DEVICE, M3		150	WB	.0001	1.4S	C	CF	C	0349
1375-00-028-5190	FIRING DEVICE, M5		200	WB	.0001	1.4S	C	CF	C	0349
1375-00-028-5192	FIRING DEVICE, M5		200	WB	.0001	1.4S	C	CF	C	0349
1375-00-028-5200	IGNITER, TIME, BLASTING		250	WB	.0001	1.4S	C	BQ	C	0131
1375-00-028-5202	PRIMER, PERCUSSION		5000	WB	.0001	1.4S	C	CE	C	0044
1375-00-028-5224	CAP, BLASTING		500	WB	.0020	1.1B	A	FA	A	0

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR #RDS 3	SHP CNTR TYPE 4	SHP CNTR NEW 5	IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES CL 7	MKG 8	LAB 9	SER 10
1375-00-781-9066	CHG, DEMOLITION, MK45	12	WB	.0728	1.1D	A	BT	A	0048
1375-00-782-5527	CORD, DET	8	WB	7.0	1.1D	A	YQ	A	0065
1375-00-834-8884	CRYPTO, EQUIP, DEST, M1A2, TH (DE)	1	WB	28.0	1.3G	B	DH	B	0010
1375-00-834-8885	CRYPTO, EQUIP, DEST, M2A1, TH (DE)	2	WB	8.5	1.3G	B	DH	B	0010
1375-00-854-0884	INITIATOR, EXPL	1	MB	.0005	1.4B	C	BB	C	0257
1375-00-926-3939	CHG, DML, SHAPED, 15 LB, M2A4	3	WB	11.5	1.1D	A	BT	A	0048
1375-00-926-3985	CHG, DEMOLITION, M183	2	WB	20.0	1.1D	A	BT	A	0048
1375-00-926-9316	CHG, DEMOLITION	96	WB	.5	1.1D	A	BT	A	0048
1375-00-935-1924	CHG, DEMOLITION, M2A3	3	WB	11.5	1.1D	A	BT	A	0048
1375-00-935-6139	CHG, DEMOLITION, 1 LB, TNT	48	WB	1.0	1.1D	A	BT	A	0048
1375-00-952-5055	DESTRUCTOR, EXPL	1	FB	1.0	1.1D	A	BF	A	0034
1375-00-965-0800	CORD, DET	6	WB	7.0	1.1D	A	YQ	A	0065
1375-01-003-9072	DET	1	FB	.0014	1.4B	C	BB	C	0257
1375-01-003-9074	LEAD ASSY	1	FB	.0091	1.4B	C	BB	C	0257
1375-01-023-7994	CHG, DML, SHAPED, 15 LB, M2A4	4	WB	11.5	1.1D	A	BT	A	0048
1375-01-037-5428	CUTTER, MK23	6	MB	.2855	1.1D	A	BT	A	0048
1375-01-037-5429	CUTTER, MK24	2	MB	1.2	1.1D	A	BT	A	0048
1375-01-040-1526	FIRING DEVICE, M142	56	WB	.0001	1.4S	C	DE	OO	0044
1375-01-057-6439	CAP, BLASTING, M7	100	WB	.0027	1.1B	A	FA	A	0029
1375-01-068-3984	CHARGE, DEMO MK 88 MOD 0	5	MB	.0002	1.4D	C	BB	C	0410
1375-01-068-3985	CHARGE, DEMO, MK86 MOD 0	5	MB	.0007	1.1D	A	BT	A	0048
1375-01-069-6671	CHARGE, DEMO, MK87 MOD 0	5	MB	.0009	1.1D	A	BT	A	0048
1375-01-069-6672	CHARGE, DEMO, MK89 MOD 0	5	MB	.0032	1.1D	A	BT	A	0048
1375-01-081-2758	CUTTING TORCH (E)	N/A	N/A	1.4	1.4G	C	BW	C	0325
1375-01-082-9919	FLSC	6	WB	.0171	1.1D	A	BT	A	0288
1375-01-082-9920	FLSC	6	WB	.0228	1.1D	A	BT	A	0288
1375-01-082-9921	FLSC	6	WB	.0428	1.1D	A	BT	A	0288
1375-01-082-9922	FLSC	5	WB	.0714	1.1D	A	BT	A	0288
1375-01-082-9923	FLSC	5	WB	.1285	1.1D	A	BT	A	0288
1375-01-082-9924	FLSC	5	WB	.1714	1.1D	A	BT	A	0288
1375-01-082-9925	FLSC	3	WB	.2857	1.1D	A	BT	A	0288
1375-01-083-2820	FLSC	6	WB	.0114	1.1D	A	BT	A	0288

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		=RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-220-1301	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-220-2923	DET TRANSFER ASSY	1	FB	.0003	1.4B	C	BB	C	0257
1377-01-220-2924	DET TRANSFER ASSY	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-220-2925	DET TRANSFER ASSY	1	FB	.0003	1.4B	C	BB	C	0257
1377-01-220-2926	DET TRANSFER ASSY	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-220-2927	DET TRANSFER ASSY	1	FB	.0003	1.4B	C	BB	C	0257
1377-01-220-4097	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-220-4098	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-220-4099	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-220-4100	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-220-4101	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-220-4102	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-220-4103	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-220-4104	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-220-4105	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-220-4106	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-220-4107	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-220-4108	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-220-4109	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-220-4110	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-220-4111	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-220-4112	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-220-4113	DET TRANSFER ASSY	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-220-4114	DET TRANSFER ASSY	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-220-4115	DET TRANSFER ASSY	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-220-4116	DET TRANSFER ASSY	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-220-4117	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-220-6338	DET TRANSFER ASSY	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-220-9123	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-220-9124	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-220-9125	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-220-9126	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-220-9127	CORD ASSY, DET	1	FB	.0005	1.4B	C	BB	C	0257
1377-01-220-9128	CORD ASSY, DET	1	FB	.0019	1.4B	C	BB	C	0257
1377-01-220-9129	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-220-9130	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-220-9131	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-220-9132	DET TRANSFER ASSY	1	FB	.0030	1.4B	C	BB	C	0257
1377-01-221-0197	CORD ASSY, DET	1	FB	.0009	1.4B	C	BB	C	0257
1377-01-221-0198	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-221-0199	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-221-0200	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-221-1972	DET TRANSFER ASSY	1	FB	.0025	1.4B	C	BB	C	0257
1377-01-221-1973	DET TRANSFER ASSY	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-221-3744	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-221-3745	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-221-3955	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-221-7590	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-221-8635	CUTTER, BRIDAL	*	FB	.0066	1.4C	C	BJ	C	0276
1377-01-221-8636	CUTTER, BRIDAL	*	FB	.0066	1.4C	C	BJ	C	0276
1377-01-222-2029	CTG, 2 SEC DELAY	*	FB	.0005	1.4S	C	DC	OO	0012
1377-01-223-2317	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-223-2318	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-223-3358	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-223-3359	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-223-3360	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-3732	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-229-3733	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-229-3734	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-229-3735	CORD ASSY, DET	1	FB	.0015	1.4B	C	BB	C	0257
1377-01-229-3736	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-229-3737	CORD ASSY, DET	1	FB	.0018	1.4B	C	BB	C	0257
1377-01-229-3738	CORD ASSY, DET	1	FB	.0014	1.4B	C	BB	C	0257
1377-01-229-3739	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-3740	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-229-3741	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-229-3742	CORD ASSY, DET	1	FB	.0016	1.4B	C	BB	C	0257
1377-01-229-3743	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-3744	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-229-3745	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-229-3746	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257
1377-01-229-3747	CORD ASSY, DET	1	FB	.0013	1.4B	C	BB	C	0257
1377-01-229-3748	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-229-3749	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-229-3750	CORD ASSY, DET	1	FB	.0022	1.4B	C	BB	C	0257
1377-01-229-5797	CORD ASSY, DET	1	FB	.0006	1.4B	C	BB	C	0257
1377-01-229-5798	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257
1377-01-229-5799	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-5800	CORD ASSY, DET	1	FB	.0011	1.4B	C	BB	C	0257
1377-01-229-5801	CORD ASSY, DET	1	FB	.0010	1.4B	C	BB	C	0257
1377-01-229-5802	CORD ASSY, DET	1	FB	.0007	1.4B	C	BB	C	0257
1377-01-229-5803	CORD ASSY, DET	1	FB	.0008	1.4B	C	BB	C	0257

Table 3-1. Explosives Hazard Classifications (Cont)

NATIONAL STOCK NO. 1	NOMENCLATURE 2	SHP CNTR			IBD/ CLASS DIV/ SCGP 6	DOD HAZARD CLASS DOT CODES			
		#RDS 3	TYPE 4	NEW 5		CL 7	MKG 8	LAB 9	SER 10
1377-01-229-5804	CORD ASSY, DET	1	FB	.0012	1.4B	C	BB	C	0257

Exhibit B-6

NAVSEA OP-5 (Eighth Revision)
RESERVED

Exhibit B-7

Navy's Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Material

GLOVE BOX EDITION

SEVENTH REVISION

MOTOR VEHICLE DRIVER AND SHIPPING INSPECTOR'S HANDBOOK FOR AMMUNITION, EXPLOSIVES AND RELATED HAZARDOUS MATERIALS

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1 December 2014

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CLICK HERE TO REPRODUCE AND ANNOTATE THIS FORM

MOTOR VEHICLE ACCIDENT REPORT	Please read the Privacy Act Statement on Page 3	INSTRUCTIONS: Sections I thru IX are filled out by the vehicle operator. Section X, items 72 thru 82c are filled on by the operator's supervisor. Section XI thru XIII are filled out by an accident investigator for bodily injury, fatality, and/or damage exceeding $500.

SECTION I - FEDERAL VEHICLE DATA

1. DRIVER'S NAME (Last, first, middle)	2. DRIVER'S LICENSE NO./STATE/LIMITATIONS	DATE OF ACCIDENT
Doe John H.	AA0I812/Va.	

4a. DEPARTMENT/FEDERAL AGENCY PERMANENT OFFICE ADDRESS	4b. WORK TELEPHONE NUMBER
Department of the Navy, Naval Weapons Station site - Yorktown	(804) 887-0000

5. TAG OR IDENTIFICATION NUMBER	6. EST. REPAIR COST	7. YEAR OF VEHICLE	8. MAKE	9. MODEL	10. SEAT BELTS USED
N9645793	$ 3,500.00	1995	Ford	Truck 15T	[X] YES [ ] NO

11. DESCRIBE VEHICLE DAMAGE

Right front fender, front fender, front end

SECTION II - OTHER VEHICLE DATA (Use Section VIII if additional space is needed)

12. DRIVER'S NAME (Last, first, middle)	13. SOCIAL SECURITY NO./ TAX IDENTIFICATION NO.	14. DRIVER'S LICENSE NO./STATE/LIMITATIONS
Chambers Tom	000-00-0000	TC00000/Va.

15a. DRIVER'S WORK ADDRESS	15b. WORK TELEPHONE NUMBER
Naval Weapons Station Yorktown, Va.	(804) 887-0000
16a. DRIVER'S HOME ADDRESS	**16b. HOME TELEPHONE NUMBER**
700 Latham Drive Newport News, Va.	(804)887-0000
17. DESCRIPTION OF VEHICLE DAMAGE	**18. ESTIMATED REPAIR COST**
Left front fender, driver door, gas tank, hood, roof, windows	$ 2,500.00

19. YEAR OF VEHICLE	20. MAKE OF VEHICLE	21. MODEL OF VEHICLE	22. TAG NUMBER AND STATE
1984	Buick	Station Wagon	XXXXX/Va

23a. DRIVER'S INSURANCE COMPANY NAME AND ADDRESS	23b. POLICY NUMBER
Last Chance Insurance Company Newport News, Va.	1234567890123
	23c. TELEPHONE NUMBER (804) 887-0000

24. VEHICLE IS	25a.OWNER'S NAME(S) (Last, first, middle)	25b. TELEPHONE NUMBER
[ ] CO-OWNED [ ] RENTAL [ ] LEASED [X] PRIVATELY OWNED	Chambers Tom	(804)887-0000

26. OWNER'S ADDRESS(ES)

700 Latham Drive Newport News, Va.

SECTION III - KILLED OR INJURED (Use Section VIII if additional space is needed)

A

27. NAME (Last, first, middle)	28. SEX	29. DATE OF BIRTH
Chambers Tom	M	

30. ADDRESS

700 Latham Drive Newport News, Va.

31. MARK "X" IN TWO APPROPRIATE BOXES	32. IN WHICH VEHICLE	33. LOCATION IN VEHICLE	34. FIRST AID GIVEN BY
[ ] KILLED [X] DRIVER [ ] PASSENGER [X] INJURED [ ] HELPER [ ] PEDESTRIAN	[ ] FED [X] OTHER (2)	Driver seat	EMS York County

35. TRANSPORTED BY	36. TRANSPORTED TO
EMS York County	Riverside Hospital

B

37. NAME (Last, first, middle)	38. SEX	39. DATE OF BIRTH

40. ADDRESS

41. MARK "X" IN TWO APPROPRIATE BOXES	42. IN WHICH VEHICLE	43. LOCATION IN VEHICLE	44. FIRST AID GIVEN BY
[ ] KILLED [ ] DRIVER [ ] PASSENGER [ ] INJURED [ ] HELPER [ ] PEDESTRIAN	[ ] FED [ ] OTHER (2)		

45. TRANSPORTED BY	46. TRANSPORTED TO

47. Pedestrian

a. NAME OF STREET OR HIGHWAY

b. DIRECTION OF PEDESTRIAN (SW corner to NE corner, etc.)

FROM | TO

c. DESCRIBE WHAT PEDESTRIAN WAS DOING AT TIME OF ACCIDENT (Crossing intersection with signal, against signal, diagonally; in roadway playing, walking, hitchhiking, etc.)

NSN 7540-00-634-4041
Previous edition not usable

STANDARD FORM 91 (REV. 2/2004)
Prescribed by GSA-FMR 102-34.295

FIGURE 3-17. Motor Vehicle Accident Report, SF 91 (Sheet 1 of 4)

SECTION IV - ACCIDENT TIME AND LOCATION (Use Section VIII if additional space is needed.)

48. DATE OF ACCIDENT	49. PLACE OF ACCIDENT (Street address, city, state, ZIP Code; Nearest landmark; Distance nearest intersection; Kind of locality (industrial, business, residential, open country, etc.); Road description).
50. TIME OF ACCIDENT 09:15 AM PM	Intersection of Rt. 238 and Rt. 17, just south of the Coleman Bridge.

51. INDICATE ON THIS DIAGRAM HOW THE ACCIDENT HAPPENED

Use one of these outlines to sketch the scene. Write in street or highway names or numbers.

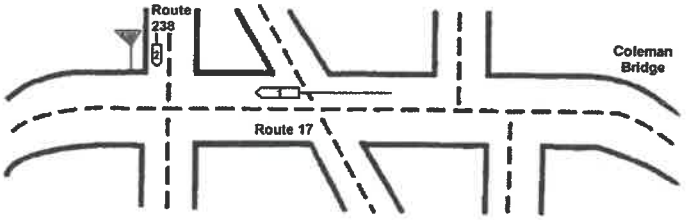
a. Number Federal vehicle as 1, other vehicle as 2, additional vehicle as 3 and show direction of travel with arrow. Example: → 1 2 ←

b. Use solid line to show path before accident → 2 and broken line after the accident - - - - - - - - - - - - - - 2

c. Show pedestrian by → ○

d. Show railroad by +++++++++++++

e. Place arrow in this circle to indicate NORTH ○



52. POINT OF IMPACT (Check one for each vehicle)

FED	2	AREA
X		a. Front
X		b. R. Front
X	X	c. L. Front
		d. Rear
		e. R. Rear
		f. L. Rear
		g. R. Side
	X	h. L. Side

53. DESCRIBE WHAT HAPPENED (Refer to vehicles as "Fed", "2", "3", etc. Please include information on posted speed limit, approximate speed of the vehicles, road conditions, weather conditions, driver visibility, condition of accident vehicles, traffic controls (warning light, stop signal, etc.), condition of light (daylight, dusk, night, dawn, artificial light, etc.), and driver actions (making U-turn, passing, stopped in traffic, etc.)

I was proceeding south on Rt. 17 within the posted speed limit. I crossed the Coleman Bridge approaching the intersection of Rt. 238 when another vehicle suddenly appeared in my lane. It was raining and the roads were slippery. I applied the brakes, but due to the road conditions, was unable to stop in time. My truck struck the other vehicle in the left front fender and driver's side door, flipping the car over and my truck came to rest on top of the car, puncturing his gas tank.

SECTION V - WITNESS/PASSENGER (Witness must fill out SF 94, Statement of Witness) (Continue in Section VIII.)

	54. NAME (Last, first, middle)	55. WORK TELEPHONE NUMBER	56. HOME TELEPHONE NUMBER
A	Drew David Ralph	(804)887-0000	(804)887-0000
	57. WORK ADDRESS	58. HOME ADDRESS	
	127 S. Jeff St. Portsmouth, Va.	6 North St. Portsmouth, Va.	
	59. NAME (Last, first, middle)	60. WORK TELEPHONE NUMBER	61. HOME TELEPHONE NUMBER
B		( )	( )
	62. WORK ADDRESS	63. HOME ADDRESS	

SECTION VI - PROPERTY DAMAGE (Use Section VIII if additional space is needed.)

64a. NAME OF OWNER (Last, first, middle)	64b. WORK TELEPHONE NUMBER	64c. HOME TELEPHONE NUMBER
	( )	( )
64d. WORK ADDRESS	64e. HOME ADDRESS	
65a. NAME OF INSURANCE COMPANY	65b. TELEPHONE NUMBER	65c. POLICY NUMBER
	( )	
66. ITEM DAMAGED	67. LOCATION OF DAMAGED ITEM	68. ESTIMATED COST

SECTION VII - POLICE INFORMATION

69a. NAME OF POLICE OFFICER	69b. BADGE NUMBER	69c. TELEPHONE NUMBER
Sgt. Frank William Pool	1	(804) 887-0000
70. PRECINCT OR HEADQUARTERS	71a. PERSON CHARGED WITH ACCIDENT	71b. VIOLATION(S)
Va. State Police	Tom Chambers	Failure to yield

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FIGURE 3-17. Motor Vehicle Accident Report, SF 91 (Sheet 2 of 4)

SECTION VIII - EXTRA DETAILS

SPACE FOR DETAILED ANSWERS. INDICATE SECTION AND ITEM NUMBER FOR EACH ANSWER. IF MORE SPACE IS NEEDED, CONTINUE ITEMS ON PLAIN BOND PAPER.

PRIVACY ACT STATEMENT

The information on this form is subject to the Privacy Act of 1974 (5 U.S.C. section 552a). Authority to collect the information is Title 40 U.S.C. Section 491 and the title 31 U.S.C. Section 7701. The formation is required by federal Government agencies to administer motor vehicle programs, including maintaining records on accidents involving privately owned and Federal fleet vehicles,and collecting accident claims resulting from accidents. Federal employees, and employees under contract, will use the information only in the performance of their official duties. Routine uses of the collected information may include disclosures to: appropriate Federal, State, or local agencies or contractors when relevant to civil, criminal, or regulatory investigations or prosecutions; the Office of personnel Management and the General Accounting Office for program evaluation purposes; a Member of Congress or staff in response to a request for assistance by the individual of record; another Federal agency, including the Department of Treasury and Justice, or a court under judicial proceedings; agency Inspectors General in conducting audits; private insurance and the collection agencies (including agencies under contract to Treasury to collect debt), and to other agency finance offices for federal management and debt collection. Furnishing the requested information is mandatory, including the Social security Number or Taxpayer's Identification Number(TIN) for use as a unique identifier to ensure accurate identification for individuals or firms in the system.

SECTION IX - FEDERAL DRIVER CERTIFICATION

I certify that the information on this form *(Sections I thru VII)* is correct to the best of my knowledge and belief.

72a. NAME AND TITLE OF DRIVER	72b. DRIVER'S SIGNATURE AND DATE
John H. Doe Truck Driver WG-8	John H. Doe 7/15/2012

SECTION X - DETAILS OF TRIP DURING WHICH ACCIDENT OCCURRED

73. ORIGIN	74. DESTINATION

75. EXACT PURPOSE OF TRIP

	DATE	TIME *(Include AM or PM)*		DATE	TIME *(Include AM or PM)*
76. TRIP BEGAN			77. ACCIDENT OCCURRED		

78. AUTHOURITY FOR THE TRIP WAS GIVEN TO THE OPERATOR	79. WAS THERE ANY DEVIATION FROM DIRECT ROUTE?
☐ ORALLY ☐ IN WRITING *(Explain)*	☐ NO ☐ YES *(Explain)*
80. WAS THE TRIP MADE WITHIN ESTABLISHED WORKING HOURS?	81. DID THE OPERATOR, WHILE ENROUTE, ENGAGE IN ANY ACTIVITY OTHER THAN THAT FOR WHICH THE TRIP WAS AUTHORIZED?
☐ YES ☐ NO *(Explain)*	☐ NO ☐ YES *(Explain)*

82. COMPLETED BY DRIVER'S SUPERVISOR	a. DID THIS ACCIDENT OCCUR WITHIN THE EMPLOYEE'S SCOPE OF DUTY ☐ YES ☐ NO	b. COMENTS

83a. NAME AND TITLE OF SUPERVISOR	83b. SUPERVISOR'S SIGNATURE AND DATE	83c. TELEPHONE NUMBER

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FIGURE 3-17. Motor Vehicle Accident Report, SF 91 (Sheet 3 of 4)

SECTION XI - ACCIDENT INVESTIGATION DATA

84. DID THE INVESTIGATION DISCLOSE CONFLICTING INFORMATION. ☐ NO ☐ YES (If checked, explain below.)

85. PERSONS INTERVIEWED

NAME	DATE	NAME	DATE
a.		c.	
b.		d.	

86. ADDITIONAL COMMENTS (Indicate section and item number of reach comment).

SECTION XII - ATTACHMENTS

87. LIST ALL ATTACHMENTS TO THIS REPORT

SECTION XIII - COMMENTS/APPROVALS

88. REVIEWING OFFICIAL'S COMMENTS

89. ACCIDENT INVESTIGATOR			90. ACCIDENT REVIEWING OFFICIAL		
a. SIGNATURE		b. DATE	a. SIGNATURE		b. DATE
c. NAME (First, middle, last)			c. NAME (First, middle, last)		
d. TITLE			d. TITLE		
e. OFFICE			e. OFFICE		
f. OFFICE TELEPHONE NUMBER			OFFICE TELEPHONE NUMBER		
AREA CODE	NUMBER	EXTENSION	AREA CODE	NUMBERf.	EXTENSION

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FIGURE 3-17. Motor Vehicle Accident Report, SF 91 (Sheet 4 of 4)

CHAPTER 5

IN-TRANSIT REGULATIONS FOR MILITARY MOTOR VEHICLES

5-1. INTRODUCTION.

This chapter identifies the in-transit regulations applicable to Navy and Marine Corps explosives drivers transporting arms, ammunition, explosives and related hazardous materials (AA&E). The following information is included:

a. Driving regulations, hazards and safety measures.

b. Protecting the security of the load.

c. Inspection in-transit.

d. Procedures for accidents, breakdowns, burning-area operations, delays, repacking, refueling and parking.

e. Procedures for water transportation.

f. Heavily populated areas.

g. Safe haven.

5-2. DRIVING REGULATIONS.

Driving regulations and safe driving guidelines particularly applicable to the explosives driver are presented in the following paragraphs.

5-2.1. SPEED REGULATIONS. Drivers of motor vehicles transporting AA&E must adhere to the posted speed limits peculiar to each state, county, or municipal roadway system. The posted speed limit for a given roadway system within each state may vary with respect to cars and trucks. In addition, some states have established separate maximum speed limits for trucks transporting Hazard Class 1 ammunition, explosives and related hazardous materials (A&E). Drivers shall be attentive to applicable speed limit requirements within each state and locality when transporting A&E off-station.

5-2.2. MINIMUM SPEEDS. No motor vehicle shall be driven at a speed so slow that it will unnecessarily impede or block the normal and reasonable movement of traffic or violate minimum state or local speed requirements.

5-2.3. DRIVING HOURS. Explosives drivers shall not be required to drive for periods exceeding the customary eight-hour day, except in extreme emergency or when relief is not available. According to 49 CFR 395.3, no driver shall drive more than 11 hours following ten consecutive hours off duty; nor shall a

driver drive for any period after having been on duty 14 hours following ten consecutive hours off duty. If approved by the originating activity, a driver may be given travel directions by another activity during the eight-hour period.

5-2.3.1. Driving Distances (Government Owned Vehicles). The Permissible Operating Distance (POD) established for government-owned vehicles within the continental United States (CONUS) is 100 miles or less one-way. Refer to NAVSEA SW020-AG-SAF-010 for further detail on the regulations and limitations regarding the use of government-owned vehicles to transport DOD freight.

5-2.4. DRUNKEN AND RECKLESS DRIVING. Explosives drivers shall never operate any vehicle while under the influence of alcohol, illegal drugs or a derivative of a narcotic drug, or the misuse of a prescription drug. Motor vehicles shall not be driven recklessly or in such a manner as to endanger life, limb or property. No motor vehicle may be driven at a speed greater than is reasonable and prudent for the type of vehicle, visibility, traffic and road conditions. The following is quoted from the Uniform Code of Military Justice (UCMJ), Article 111, and is applicable to military personnel: "Any person subject to this code who operates any vehicle while drunk, or in a reckless or wanton manner, shall be punished as a court-martial may direct." Civilian drivers are subject to all local laws when suspected of drunken or reckless driving. Drivers are subject to disciplinary actions and penalties as outlined in paragraph 2-6.

5-2.5. ARREST. If arrested, the driver (military or civilian) shall notify his/her home station immediately. If possible, the driver's immediate supervisor shall be contacted as well.

5-2.6. GENERAL RULES FOR SAFE DRIVING. The following general rules shall be observed by the explosives driver:

a. Observe and obey all road signs.

b. Maintain safe clearance for bridges and tunnels as posted.

c. Exercise caution when overtaking, meeting or being passed by other vehicles.

d. Use hand signals or directional lights when passing or turning.

e. Exercise caution when passing a stationary streetcar or bus, if local regulations permit such passing.

f. Exercise caution when approaching emergency vehicles.

g. Exercise caution when backing or maneuvering.

h. Exercise caution when stopping or parking.

i. Observe right-of-way regulations.

j. Be certain vehicle and cargo are secure.

k. Maintain a safe following distance for traffic and road conditions.

l. Exercise caution when near or passing an open fire.

m. Wearing portable headphones, earphones, or other listening devices while operating a motor vehicle is prohibited.

n. Drivers shall understand and obey all local civil regulations, as well as any on-station regulations, concerning the use (or restricting the use) of cell phones in a moving vehicle. Drivers shall always exercise caution when operating cell phones, "hands free devices," or global positioning systems, and whenever possible, use these devices only when the vehicle is safely stopped.

5-2.7. ROAD SIGNS. Road signs used in the United States conform with international agreements.

5-2.8. YIELDING RIGHT OF WAY. Ambulances, firefighting equipment, police, and similar emergency vehicles using warning lights and/or sirens, shall have the right of way over all other traffic, including vehicles carrying AA&E. Military formations, whether at a halt or in motion, have the right of way at all times. Drivers shall exercise caution when passing or approaching such formations.

5-2.9. INSTRUCTIONS FOR SPECIFIC SITUATIONS. Procedures to be followed by the driver with respect to tunnels, railroad crossings, convoys, bridges, heavily populated areas and stops are presented in the following paragraphs:

5-2.9.1. Tunnels. Vehicles transporting A&E shall not be routed through tunnels if it can be avoided. If it becomes absolutely necessary to use tunnels, the driver shall:

a. Contact the local police to obtain permission.

b. Request advice from the local law enforcement authorities on existing laws.

c. Comply with written instructions that shall include authorization to use the tunnel as arranged by the cognizant naval activity.

d. Advise the proper local authorities and the originating activity if unable to meet the scheduled time for use of a tunnel.

5-2.9.2. Railroad Crossings. Drivers of vehicles carrying AA&E shall exercise extreme caution when approaching railroad crossings. All drivers shall, when approaching any railroad crossing, use the four-way flashers 300 feet from the tracks and slowly come to a full stop not more than 50 feet from, nor closer than 15 feet to, the nearest rail of the crossing. The driver will look in both directions and shall not proceed until he/she is certain that all tracks are clear. Full stops need not be made at:

a. Street car crossings in a town's business or residential district.

b. Railroad grade crossings where a police officer or a crossing watchperson directs the traffic to proceed.

c. Abandoned or exempted grade crossings marked by, or with the consent of, the proper state authority. The marking shall be clearly visible from the driver's position in the cab of the vehicle.

5-2.9.3. Convoys. In motor vehicle convoys, drivers shall not become widely separated, but shall maintain a safe distance between vehicles. Generally, the safe distance shall not be greater than 300 feet; however, vehicles should not be less than 50 feet apart.

5-2.9.4. Bridges. A motor vehicle transporting AA&E shall approach a drawbridge slowly so that a stop may be made safely before the lip of the drawbridge is reached. The driver shall proceed only when the drawbridge is completely closed; and, if traffic signals are present, when the signal is green. When a prescribed route includes toll bridges, the driver shall be advised of this fact in advance of travel. The driver shall:

a. Contact local toll bridge authorities from the starting point; or, at the most convenient scheduled stopping point along the route; or, obtain permission to use the facilities and information regarding special regulations.

b. Cooperate with local authorities by providing them with any information required regarding the vehicle's load and schedule. Follow their instructions concerning the movement of the vehicle over the bridge.

c. Take note of any special directions contained in the written instructions that shall include authorization to use the bridge as arranged by the cognizant activity.

5-2.9.5. Heavily Populated Areas. According to 49 CFR 397.67(a) and (b), a motor vehicle carrying placarded cargo shall be operated over routes that do not go through or near heavily populated areas, places where crowds are assembled, tunnels, narrow streets, or alleys. Drivers shall comply with all state and municipal laws and ordinances. Exceptions to this general rule are as follows:

a. There is no practicable alternative.

b. A reasonable deviation is necessary to reach terminals, points of loading or unloading, facilities for food, fuel, rest, or safe haven.

c. A reasonable deviation is required in response to emergencies as determined by local emergency response officials.

Operating convenience is not a basis for failing to avoid heavily populated areas.

In response to a confirmed case of military necessity or with respect to emergency operations conducted by Explosive Ordnance Disposal (EOD) personnel, Navy/Marine Corps owned motor vehicles carrying A&E may be required to travel through or near populated areas. In this case, the driver shall contact local law enforcement authorities to advise them of the proposed trip before approaching the perimeter of the municipality. The driver will follow the routing instructions provided by the law enforcement authorities, which may include police escort.

5-2.9.6. Stops. When transporting AA&E, drivers shall make no unscheduled stops except in an emergency. The vehicle shall not be left unattended at anytime.

5-3. DRIVING HAZARDS.

The transportation of A&E by any method is extremely dangerous. All rules for road safety shall be carefully studied and practiced by explosives drivers. Some of the more common hazards may be avoided or minimized by applying the information presented in paragraphs 5-3.1 through 5-3.3.

5-3.1. CARBON MONOXIDE. Carbon monoxide is a deadly gas that kills quickly and without warning if inhaled in sufficient quantities. In small amounts it causes drowsiness that results in dangerous inattention by the driver on the highways. The following safety measures shall be taken to prevent carbon monoxide gas from escaping into the vehicle:

a. The engine shall be kept in good condition. Engines and undercarriages shall be kept free of excessive oil and grease.

b. The manifold shall be inspected for leaks in the parts, the exhaust pipe and muffler.

c. The driver shall not leave the engine running while parked.

5-3.2. DAMAGE TO CARGO. One of the principal reasons for the careful inspection of containers loaded with A&E is to avoid the hazards of fire and explosion. A leaking or broken container of corrosives or acids can injure the driver by causing burns, fume poisoning or suffocation. Fires and explosions may also result from careless handling of the containers or from the shifting of an improperly dunnaged load.

CAUTION

Drivers shall avoid sharp braking during downhill travel. This operation is one of the principal causes of load shifting and usually results in damage to the cargo.

5-3.3. WEATHER CONDITIONS. Drivers shall be extremely cautious when weather such as snow, ice, sleet, fog, rain or electrical storms affect visibility or traction. If conditions become extremely hazardous, operation of the vehicle shall be temporarily discontinued. When compliance with these instructions increases hazards to road traffic, the vehicle shall be driven to the nearest military activity for safe haven.

5-4. SAFETY MEASURES.

While transporting AA&E, all safety regulations shall be strictly followed.

WARNING

Matches, lighters or other fire, flame, or spark-producing devices shall not be permitted within 25 feet of a motor vehicle loaded with A&E.

5-4.1. FLAME-PRODUCING DEVICES. No person shall carry a lighted cigarette, cigar or pipe, or any fire, flame or spark-producing device within 25 feet of a vehicle transporting A&E.

CAUTION

Explosives drivers shall adhere to DOT regulations and state and local laws governing the use of snow chains during inclement weather. Snow chains have the potential for creating sparks.

5-4.2. SMOKING REGULATIONS. Smoking is prohibited within 25 feet of the following:

a. A motor vehicle which contains Class 1 materials, Class 5 materials, or flammable materials classified as Division 2.1, Class 3, Divisions 4.1 and 4.2, or;

b. An empty tank motor vehicle which has been used to transport Class 3, flammable materials, or Division 2.1 flammable gases, which when used, was required to be marked or placarded in accordance with 49 CFR Part 172.500, Subpart F.

5-4.3. TRANSPORTING FLAMMABLES. Vehicles used for the transportation of flammables shall be kept clean and free of oily rags or similar combustible materials. Valves, nozzles and other connections on the vehicle shall be kept free of leaks and in good operating condition at all times.

5-4.4. EXPOSURE TO WEATHER. A&E shall not be exposed unnecessarily to the direct rays of the sun or to inclement weather, i.e. rain or electrical storms.

5-4.5. LOAD INTERFERENCE. No motor vehicle shall be operated if the cargo or any other object obscures the driver's view in any direction; interferes with the free movement of arms or legs; prevents free and ready access to equipment for emergencies; or, prevents the free and ready exit of the driver from the cab of the vehicle.

WARNING

Flares and signals that produce flame shall not be used as warning devices for disabled vehicles carrying A&E.

5-4.6. WARNING DEVICES. In the case of an accident, incident, breakdown or stop made for any reason on the public highways, a motor vehicle carrying A&E shall have three bidirectional emergency reflective triangles as warning devices to approaching traffic. These devices eliminate the need for flags and reflectors and are effective during the day or night.

5-4.6.1. Posting Warning Devices. Immediately upon stopping, the driver shall set the turn signals to flash simultaneously; and, place three red emergency reflective triangles on the traffic side of the vehicle per the following directions:

a. One warning device shall be placed 100 feet in front of the motor vehicle and one 100 feet in back of the vehicle in the center of the traffic lane it occupies. One warning device shall be placed on the traffic side of the vehicle not more than 10 feet from the front or rear of the vehicle. (See figure 5-1A.)

b. If the stop is made within 500 feet of the crest of a hill, a curve, or any object obstructing the vehicle from the view of approaching traffic, the warning devices shall be placed not less than 100 feet or more than 500 feet from the vehicle in the direction of the hill, curve or other obstruction. One warning device shall be placed on the traffic side of the vehicle not more than 10 feet from the front or rear of the vehicle. (See figure 5-1B.)

c. If the stop is made on any lane of a divided highway, one warning device shall be placed 200 feet in back of the stopped vehicle in the center of the traffic lane it occupies; one warning device shall be placed 100 feet in back of the vehicle in the center of the traffic lane it occupies; and, one warning device shall be placed on the traffic side of the vehicle within 10 feet from the rear of the vehicle. (See figure 5-1C.)

d. When any motor vehicle used in the transportation of AA&E is disabled or stopped entirely off the roadway on an adjacent shoulder, the warning devices shall be placed as near as practical on the shoulder at the edge of the roadway.

5-4.6.2. Picking Up Warning Devices. The driver shall ensure signals are flashing simultaneously before picking up the emergency warning devices from the highway.

5-5. PROTECTING THE SECURITY OF THE LOAD.

The driver shall be aware of security policies, procedures and responsibilities (see paragraphs 2-8 through 2-8.3). Most importantly, drivers shall be aware of, and adhere to, physical security requirements for their load prescribed by the established Force Protection Condition (FPCON), shown in NAVSEA SW020-AG-SAF-010.

5-5.1. VEHICLE SECURITY. The doors of all motor vehicles containing AA&E shall be securely sealed and under constant surveillance when outside a restricted, fenced area. The only exception is when it is necessary to open the vehicle for inspection or to handle the contents. In this event, a responsible person shall be in charge of the vehicle. All doors on vehicles containing AA&E shall be closed securely before the vehicle is in motion. When open trucks are used, the load shall be protected from the sun and weather by waterproof, fire-resistant tarpaulins (see paragraph 4-2 and 4-2.4).

5-5.2. SEALS. Refer to paragraphs 4-8 and 4-8.1 regarding the requirements for transportation conveyance seals, NAVSUP Form 407, Seal Notice (figure 3-14), and seal tags for AA&E shipments.

5-5.2.1. Breaking of Seals En Route. In the event that seals are broken or replaced en route, the driver shall notify the shipping activity or receiving activity immediately and request instructions concerning the security of the cargo prior to continuing to destination. Drivers shall remain with the vehicle at all times to protect the cargo until a new seal is applied. In the case of sensitive or classified shipments, the Commanding Officer (CO) of the nearest military installation shall be notified immediately so that qualified personnel can be dispatched, if required. At the destination, the proper authority shall inspect the cargo to ensure that no breach of security has been committed. If compromise of the load is suspected, the CO at the receiving activity will immediately notify the nearest field office of the Naval Criminal Investigative Service (NCIS) and NOSSA.

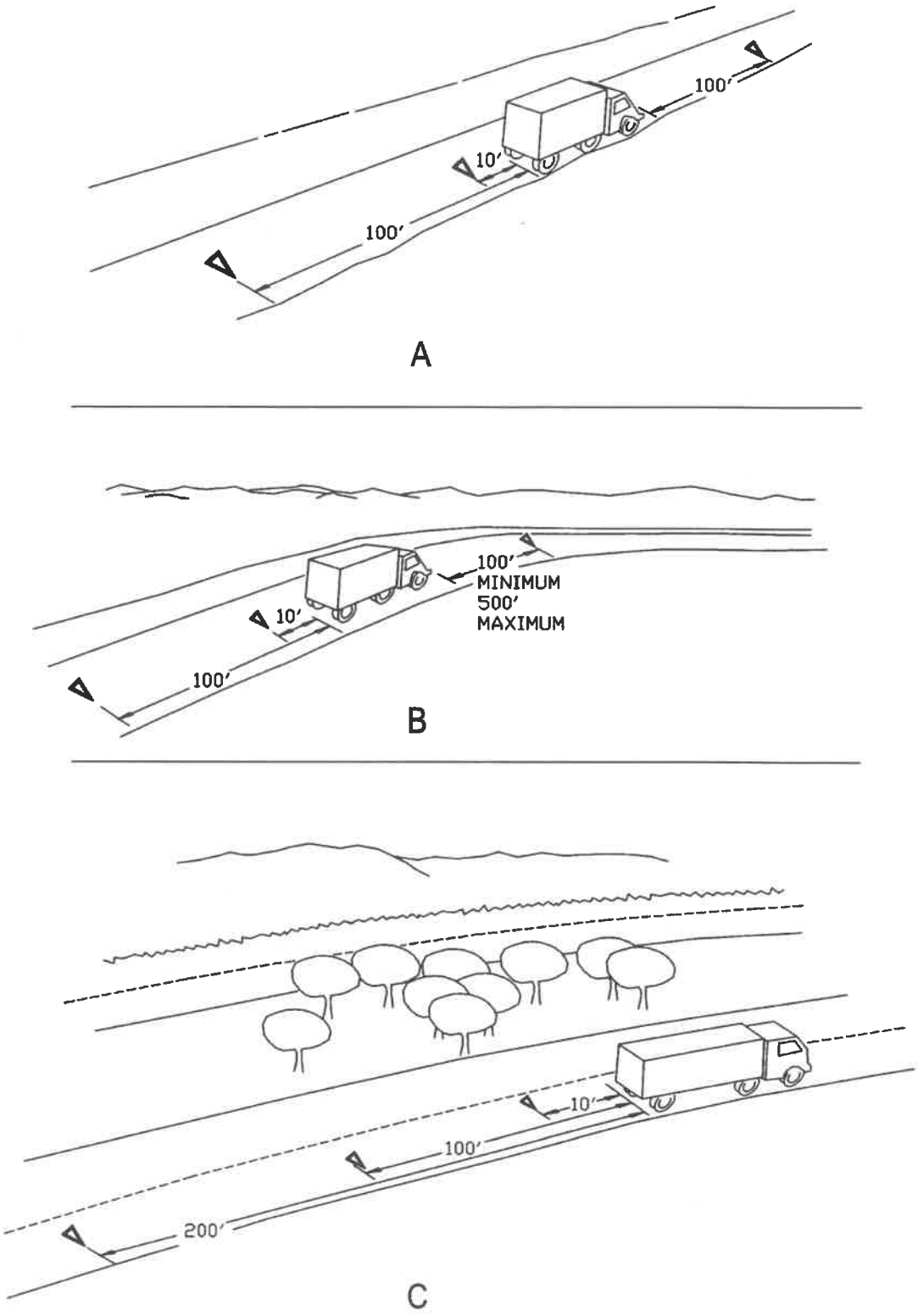

FIGURE 5-1. (A-C) Posting Warning Signals for Highway Stops

5-5.3. GUARDING VEHICLES. When outside a military station, the cargo doors of all motor vehicles containing AA&E shall be secured and motor vehicles shall be under constant surveillance. For off-station AA&E movements, in the context of the Navy's two-driver requirement, constant surveillance means (1) that a Signature and Tally Record, DD Form 1907 will be maintained; (2) that at least one driver will remain in the cab of the vehicle, or remain within 25 feet of the vehicle during brief stops, provided the vehicle is within full, unobstructed view. When vehicles are parked on-station in a barricaded area or in other assigned locations, their cargo doors shall be sealed and the ignition keys left in the vehicle, unless security considerations dictate that they be removed. When ignition keys are removed because of these considerations, they shall be made readily available to personnel assigned to move the vehicles. When trailers loaded with AA&E are parked without attached tractors, tractors will be made available for moving them. The ignition keys for these tractors shall be handled in the same manner as specified for AA&E loaded motor vehicles. The security of the cargo and the vehicle shall be the direct responsibility of the explosives driver while under the driver's custody. Drivers must be mindful of both the hazardous nature of the cargo and the Security Risk Category (SRC) assigned to the cargo. In cases where a courier is used, the courier shall be responsible for the cargo. The level of on- and off-station security surveillance over AA&E movements will vary according to the SRC of the AA&E and the existing local FPCON.

5-5.4. SAFE HAVEN. The origin transportation officer must schedule shipments to arrive at the destination within normal receiving hours, making every effort to avoid layover of shipment during weekends, holidays, and non-receiving hours. DOD 5100.76-M and OPNAVINST 5530.13 (series) require that installations and activities offer safe haven to motor carriers who have encountered an emergency situation during the transport of DOD AA&E. These regulations also require that activities accept AA&E shipments arriving during non-delivery hours. In either case, the activity shall ensure the vehicle is parked in a secure area and provided appropriate protection commensurate with the SRC of the delivered items. SRC I and SRC II AA&E will be provided the level of physical security protection detailed in NAVSEA SW020-AG-SAF-010. Safe haven is strictly temporary in nature, and is intended to minimize the length of time that ordnance is in the public domain. AA&E laden vehicles must be removed from the secure area as soon as practicable upon determination by the CO/OIC and/or appropriate civil authorities that any threat to the shipment's integrity has diminished.

5-6. INSPECTION IN TRANSIT.

Drivers must examine their vehicle tires at the beginning of each trip and each time the vehicle is parked. Vehicles shall be stopped and inspected at all specified check points en route. The requirement for operators of vehicles transporting AA&E to stop at specified intervals and check their tires was eliminated by the Federal Register of 4 Oct. 2002. The motor vehicle and cargo shall be inspected by the driver for the following:

a. General condition of the motor vehicle and clean placards.

b. Condition of the tires: A soft, flat or unusually hot tire must be repaired, replaced or properly inflated before the trip is resumed. An overheated tire shall be removed and placed a safe distance from the vehicle. The driver shall not operate the vehicle until the cause of overheating is corrected.

c. Cargo securement: According to 49 CFR 392.9, drivers are instructed to inspect load securement devices within the first 50 miles after beginning a trip, and make necessary adjustments as required. Thereafter, the cargo securement devices will be reexamined when the driver makes a change in duty status, drives for more than 3 hours, or drives for more than 150 miles, whichever comes first. Note that the requirement to examine securement devices is not applicable to the driver of a closed and sealed van-type motor vehicle. If load-shift involving a closed and sealed van-type motor vehicle is suspected, drivers are instructed to notify the shipper, report circumstances and request permission to break the seal and inspect the condition of cargo securement system. For classified shipments, if the stability of the load is in doubt the instructions in paragraph 5-5.2.1 shall be followed. After inspection, the motor vehicle will be re-sealed (drivers shall have been furnished with extra seals for this purpose). Seal application instructions are provided in paragraphs 4-8 and 5-5 of this manual. Drivers are permitted to make adjustments to securement systems as required. However, in the event of substantial misalignment of the AA&E cargo and/or damaged cargo, drivers must notify their carrier dispatchers and the shipper for instructions. Delays must be reported in accordance with paragraph 5-10 of this manual.

5-7. PROCEDURES FOLLOWING AN ACCIDENT.

The potentially disastrous consequences of an accident involving vehicles loaded with A&E dictate that emergency safety procedures be followed in every case. The explosives driver has primary responsibility for taking appropriate steps immediately. NAVSEAINST 8020.18 (series) provides DON policy and procedures concerning emergency response to accidents involving DOD munitions and explosives.

5-7.1. REQUIRED ACTION. When a motor vehicle loaded with A&E becomes involved in an accident, the driver shall:

a. Stop the vehicle immediately.

b. Turn off the ignition.

c. Set the brake and chock the vehicle to prevent movement.

d. Post warning devices on the highway. Ensure that all turn signals are flashing simultaneously while warning devices are being posted.

e. If fire results, the driver shall follow the firefighting instructions found on the shipping papers (refer to paragraphs 8-5 through 8-6.2).

f. Notify local law enforcement authorities.

g. Render first aid. Do not move badly injured persons unless it is absolutely necessary.

h. Notify both shipping and receiving activities by the fastest available means.

i. Notify the Army Operations Center (AOC) at 703-697-0218/0219 collect, or DSN 227-0218/0219 should DOD/EOD assistance be required for clean-up operations.

NOTE

EOD personnel or other competent DOD official(s) must be dispatched to the scene of an accident involving damaged A&E materials. See subparagraph (k) below for further instructions.

j. Provide emergency response information (BL and/or DD Form 2890) to law enforcement authorities and firefighting personnel. This data will provide the type of cargo, dangerous characteristics, firefighting techniques, operating distances for firefighters and equipment, and personnel evacuation distances.

k. Do not attempt to handle damaged A&E cargo or unload a disabled vehicle. Assist emergency first responders as necessary. Handling of damaged A&E cargo will begin after the damaged cargo has been declared safe to move and transport by EOD personnel or other competent on-scene DOD officials.

l. Do not sign any insurance or release documents.

m. Express no opinions as to who is to blame for the accident.

n. If an unattended vehicle is struck, make a reasonable effort to locate the missing driver, while maintaining constant surveillance over the vehicle and its AA&E cargo. If this is not possible, leave the following information for the owner of the unattended vehicle:

(1) Name.

(2) Address or home station.

(3) State or Federal Government license numbers.

(4) Destination.

(5) Any other information pertinent to the accident.

o. Stand-by to assist emergency first responders and/or DOD personnel in clean-up operations as required.

NOTE

Motor vehicle disentanglement operations shall not begin until the A&E has been offloaded from the cargo carrying vehicle and moved a safe distance away from the immediate vicinity of the accident.

5-7.2. REQUIRED REPORT. Every accident involving a Navy vehicle shall be reported by the driver of the vehicle on the Motor Vehicle Accident Report, SF 91. Refer to paragraph 3-5.1 and figure 3-17. Detailed instructions for completion of this form are provided in appendix B.

5-8. PROCEDURES FOLLOWING A BREAKDOWN.

When a vehicle loaded with AA&E is disabled due to mechanical failure or reasons other than an accident, the driver is required to take action to ensure the safety of the public and to protect the cargo. If fire results, the driver shall follow the firefighting instructions found on the shipping papers (see paragraph 8-5 through 8-6.2).

WARNING

Do not attempt to jump start a motor vehicle that has A&E cargo onboard.

5-8.1. REQUIRED ACTION. The procedure listed below shall be followed in cases of breakdown:

a. If safe and practicable to do so, drive the vehicle to a safe parking place as far off the highway as possible and away from congested areas.

b. Immediately turn on the vehicle's two front and two rear hazard warning signals; post the emergency warning devices.

c. Notify state/local (as applicable) law enforcement authorities; request on-scene traffic control and security assistance as required -- dispatch of two law enforcement personnel for safety and protection of cargo is preferred.

d. Contact responsible personnel at your home station (point of origin) to report the breakdown and request guidance/assistance as necessary; contact destination activity to report delay in-transit due to breakdown.

e. With concurrence of home station responsible personnel, contact a local vehicle repair shop and arrange for on-site repair work.

WARNING

No hot work shall be performed on a vehicle with A&E cargo present in the vehicle.

f. If on-site repair work is not feasible, with concurrence of responsible home station personnel, arrange to have the A&E loaded vehicle towed to a capable repair facility; choose a repair facility that is located away from congested residential and/or industrial areas. Towing operations will begin once it has been determined by competent personnel that the A&E loaded vehicle is safe to tow.

WARNING

Do not repair the vehicle in an enclosed garage or work area.

g. If on-site or work shop repair work (with or without tow) is not feasible, then, with concurrence and assistance received from responsible home station personnel, arrange to have an

alternate motor vehicle, along with qualified DOD A&E handling personnel and equipment dispatched to the scene of the breakdown. Commence on-site A&E load transfer operations as necessary. See paragraph 5-11 for instructions pertaining to repackaging and transferring A&E cargo in-transit.

5-8.2. REQUIRED REPORT. A complete report shall be made to the safety officer or duty officer at the driver's home activity. The report shall include all pertinent details, including a description of the cause of the breakdown, location, terrain, interval of delay, steps taken to effect repairs, and either a certified statement of costs (if the driver was able to have repairs made), or a receipt if the driver paid for repairs. The report shall be presented to the driver's supervisor, who shall forward it to the safety officer. See paragraph 3-5.2.

5-9. PROCEDURES IN BURNING-AREA OPERATIONS.

Explosives drivers engaged in burning-area operations, shall follow the orders and instructions given by the supervisor or ordnance worker in charge of the area.

5-9.1. ENTERING THE AREA. When a vehicle delivers authorized materials for the burning area, the ordnance supervisor shall direct the driver to the location for unloading operations or to a holding area behind a barricade.

5-9.2. UNLOADING THE VEHICLE. The driver shall remain in the cab during unloading operations and shall not be required to assist in the unloading. After unloading, the ordnance supervisor or ordnance worker shall direct the driver to drive behind the burning-lane barricade, or another designated area, park the vehicle and turn off the engine.

5-9.3. ACTION DURING ELECTRICAL STORMS. The driver shall park the vehicle so that it will not endanger personnel shelters or centers. The driver shall evacuate the vehicle only on orders from the ordnance supervisor or ordnance worker.

5-9.4. LEAVING THE AREA. All vehicle floors shall be swept thoroughly at the burning area. The vehicle shall be inspected by the ordnance worker before it is permitted to leave.

5-10. PROCEDURES IN CASE OF DELAY FOR MORE THAN 5 HOURS.

If for any reason a motor vehicle carrying AA&E is delayed for more than 5 hours, the driver shall report the delay to the transportation manager or duty officer of the home activity immediately. Delays resulting from delivery being restricted to normal working hours shall not be reported.

5-10.1. REQUIRED ACTION. The explosives driver shall take immediate appropriate action and report the reason for the delay. If the vehicle has been involved in an accident, incident or breakdown, the driver shall observe the procedures outlined in paragraphs 5-7 and 5-8, respectively; and, shall report the situation to the home activity. If the delay is caused by road or weather conditions, the driver shall observe appropriate safety precautions and determine the most practical course of action. Public safety shall always be the first consideration.

5-10.2. REQUIRED REPORT. The report of delay shall provide the following information:

a. Exact location of the vehicle.

b. Cause of the delay.

c. A statement that local law enforcement authorities have been notified.

d. A statement attesting to the level of security that was adhered to throughout the period of delay. For example, in addition to the driver(s) ability/inability to carry out mandatory constant surveillance duties and responsibilities, indicate the extent to which state and/or local law enforcement officials contributed to the surveillance mission.

5-11. REPACKAGING OR TRANSFER OF LOAD IN TRANSIT.

When practical, and subject to the imposition of reasonable risk control measures, a package of A&E that has been damaged in transit may be replaced or repaired and its contents transferred to the new or required package. The repackaging work must be performed by qualified DOD personnel in accordance with standard A&E packaging procedures. On-scene EOD or other competent DOD personnel must certify that the affected A&E materials are safe to move/handle prior to beginning the repackaging work.

a. Repackaging in Transit.

(1) In-transit repackaging of A&E cargo that has been certified safe to move/handle shall be performed in accordance with approved methods using serviceable packaging supply materials. Questions regarding A&E packaging can be directed to the Naval PHST Center at (973) 724-3388.

(2) The repackaging work must be performed at a safe location in proximity to the cargo transfer site consistent with relevant emergency response operations that may be in process. Care shall be taken to mitigate operational hazards including minimizing public/personnel exposure to risk (keep unauthorized personnel away). To the extent practicable, perform repackaging work at a safe distance from other known concurrent hazardous operations/environmental conditions that may exist in the immediate area. Emergency responders shall also be cognizant of the need to control risk associated with the exposure of susceptible A&E materials to electromagnetic radiation hazards.

WARNING

Drivers shall not dispose of damaged packages/containers -- standing rule applies to both empty packages/containers and those that contain residual A&E items.

(3) When repair of a damaged package is not feasible, the damaged package and its contents shall be diverted only the minimum distance necessary to the nearest compatible civil or DOD safe haven facility pending final disposition instructions. A safe to handle/move/transport certification by EOD or other competent DOD personnel must be obtained prior to execution of this contingency action.

b. Transferring in Transit. Class/Division 1.1, 1.2 and 1.3 A&E and/or Poisons 6.1, shall not be transferred from one container to another or from one vehicle to another on any public highway, street or

road, except in cases of emergency and as directed by a qualified DOD official. In the event of an emergency, the driver shall take action to warn emergency responders and other highway users of ensuing dangers. The driver's responsibility in this regard becomes even more critical when the prospect of transferring A&E cargo from one conveyance to another is apparent. The following actions shall be taken:

(1) Drive the vehicle to a safe parking place as far off the highway as possible and away from congested areas.

WARNING

If the vehicle is diesel-powered, set the transmission in neutral.

(2) Turn off the engine and set the handbrakes.

(3) Immediately turn on the vehicle's two front and rear hazard warning signals, and post the emergency warning devices.

(4) Provide constant surveillance over the vehicle and its cargo while awaiting the arrival of a qualified DOD emergency response A&E cargo handling supervisor and crew members.

c. Reports. For all occasions involving the repackaging and/or transfer of AA&E material in-transit, the driver shall complete a report of corrective action taken. As a minimum, the repackaging and/or transfer report shall include the following information:

(1) Condition of the material before and after repackaging.

(2) Number of containers/packages damaged.

(3) Statement of corrective action taken.

The report will be forwarded to the activity AA&E Safety Officer; a copy of the report will be forwarded to NOSSA (N5).

5-12. PROCEDURES FOR REFUELING A LOADED MOTOR VEHICLE.

A motor vehicle designated for transporting A&E on and off station shall be fueled prior to the commencement of A&E loading operations. An adequate amount of fuel shall be added to the fuel tank to enable the driver to complete delivery of the A&E cargo without having to refuel in-transit. If, while en route to destination, contingency factors beyond the driver's control should arise that require refueling, the following safety precautions shall be followed:

WARNING

Compressed Natural Gas (CNG) powered vehicles shall not be refueled within 100 feet of A&E.

a. The engine shall be turned off.

b. The lights shall be turned off.

WARNING

In the event of a fire, if a carbon dioxide (CO_2) fire extinguisher is present for use in extinguishing the fire, do not direct its content at or into an open fuel tank. Even with a grounded fuel hose, static electricity can be generated and may ignite the fuel vapor, causing an explosion. This is due to high velocity streams of CO_2 being injected into the concentrated vapors of hydrocarbon fuels such as jet propulsion (JP), gasoline, diesel, etc.

c. One driver shall stand by with a fire extinguisher.

d. The nozzle of the fuel hose shall be in continuous and firm contact with the intake pipe of the fuel tank or be otherwise grounded (grounding cable is included in safety equipment required on vehicles).

e. Under no circumstances shall the vehicle be fueled simultaneously with other vehicles.

f. In the event of a fuel spill during refueling, motors on the equipment or refueling unit shall not be started until the tank is capped, and the spill is thoroughly washed down with water; or, the equipment is first moved manually at least 50 feet from the spill.

g. No person may smoke or carry a lighted cigarette, pipe or cigar, or any fire, flame or spark-producing device within 25 feet of the fueling operations.

h. A person must be in constant control of the fueling process at the point where the fuel tank is filled.

5-13. PARKING A LOADED MOTOR VEHICLE

In the interest of protecting the public well-being to the maximum extent, special federal and DOD safety regulations have been established for driving and parking motor vehicles loaded with Class/ Division 1.1, 1.2, and 1.3 A&E. Therefore, military and civilian drivers tasked by the Navy Department to operate motor vehicles engaged in transporting these hazardous materials must comply with the following requirements:

5-13.1. GENERAL RESTRICTIONS. Only essential personnel vehicles shall be operated within 100 feet of fuel storage areas and transfer operations (except service stations), where low-lying accumulations of flammable vapors or hazardous ignition-combustible material sources are present. Drivers of vehicles transporting Class/Division 1.1 through 1.3 A&E shall not park near fuel pumps or similar areas, except when refueling. In addition, vehicles shall not be parked over any grassy area or unpaved surfaces which may be oil-soaked.

WARNING

Under no circumstances shall the driver of a vehicle carrying Class 1.1, 1.2 or 1.3 A&E park in a public garage, on a public parking lot, or leave the vehicle unattended.

5-13.2. PARKING IN THE PUBLIC DOMAIN. The following regulations shall be adhered to for parking Class/Division 1.1, 1.2 and 1.3 A&E loaded motor vehicles in the public domain:

a. Congested Areas. The motor vehicle shall not be parked within 300 feet of a bridge, tunnel, dwelling, or place where people work, congregate, or assemble, except for brief periods when the necessities of operation require the vehicle to be parked and make it impracticable to park the vehicle in any other place.

b. Public Streets or Highways. The motor vehicle shall not be parked within 5 feet of the traveled portion of a public street or highway.

c. Private Property. The motor vehicle shall not be parked on private property (including premises of fueling or eating facilities) without the knowledge and consent of the person who is in charge of the property and who is aware of the nature of the hazardous materials the vehicle contains.

NOTE

See paragraphs 5-7 and 5-8 of this manual for instructions related to accidents and breakdowns respectively that may impact the ability to conform to customary parking rules for vehicles loaded with Class/ Division 1.1, 1.2 and 1.3 A&E.

5-13.3. PARKING ON-STATION. Vehicles loaded with Class/Division 1.1, 1.2 and 1.3 A&E shall be parked on-station only in locations identified in approved site plans and associated fire maps. The following additional regulations apply:

a. AA&E loaded vehicles shall not be parked overnight, except when late or weekend arrival does not permit immediate unloading. In this case, AA&E loaded vehicles shall be parked in approved secure holding areas per the provisions of NAVSEA SW020-AG-SAF-010, Chapter 2 and NAVSEA OP 5 Volume 1, Chapter 12.

b. A&E loaded vehicles shall not be parked and left unattended in front of the doors to magazines and/or operating buildings.

c. Approved secure holdings areas, as noted in subparagraph a. above, shall be used to park AA&E loaded motor vehicles. On an exception basis only, when warranted by current operating conditions, AA&E loaded vehicles may be parked temporarily in open areas between magazines in accordance with existing explosives safety quantity-distance (Q-D) criteria and subject to Explosives Safety Office concurrence.

d. A vehicle that is undergoing AA&E load or offload operations may be parked temporarily alongside a magazine, operating building, or other Potential Explosion Site (PES) pending completion of the load/offload work provided that:

(1) The appropriate Q-D criteria are observed.

(2) The combined Net Explosive Weight (NEW) of the explosives contained in the vehicle, the magazine, operating building, etc., shall not exceed the explosive limit specified for the PES.

(3) An AA&E loaded vehicle parked in a restricted area shall have its engine turned off, brakes set, rear chocked, and ignition key left in the vehicle. If security considerations dictate that the ignition keys be removed, they shall be made readily available to personnel assigned to move the vehicle.

NOTE

Restricted areas differ at each individual activity depending upon Q-D considerations, location of magazines, proximity to inhabited buildings, and the hazard class of magazine contents. Refer to OPNAVINST 5530.14 (series) for further clarification on the various levels of restricted areas.

5-14. PROCEDURES FOR WATER TRANSPORTATION.

When a motor vehicle loaded with AA&E requires water transportation en route, the driver and vessel authorities shall share responsibility for the safety of the public and cargo. Drivers of vehicles shall observe the following procedures:

a. Deliver a letter of identification to the master of the vessel or to a designated representative requesting transportation. The letter shall be signed by the CO of the activity at which the shipment originated. Whenever possible, these letters should be mailed prior to the trip.

b. Deliver to the vessel representative the shipping documents containing the full description of the cargo for review. These papers will be returned to the driver.

c. Drive the vehicle to the location indicated by the vessel representative.

d. Shut off the engine and do not restart it until directed by the vessel representative.

e. Turn off all vehicle lights and do not turn them on again until directed by the vessel representative.

WARNING

One person shall remain in the cab of a diesel powered vehicle. The transmission shall be left in neutral and the parking brake applied. There is a possibility that a warm engine could self-start if the vehicle should roll.

f. Set the brakes securely and chock the wheels to prevent movement. Place non-diesel powered vehicles in the lowest forward gear or in reverse.

g. Remain with the vehicle.

h. Make no repairs or adjustments to the vehicle while aboard the vessel.

i. Do not smoke, and warn others to refrain from smoking within 25 feet of the vehicle.

j. Obey all instructions given by authorized vessel personnel during the voyage and during the drive-on and drive-off operation.

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CHAPTER 8

FIRE REGULATIONS

8-1. INTRODUCTION.

The danger of fire is inherent in every motor vehicle loaded with ammunition, explosives and related hazardous materials (A&E). This chapter provides instructions for explosives drivers regarding preparation for potential fire, preventive measures, passing fires along the highway, firefighting equipment, and firefighting procedures. Explosives drivers are required to read and understand the following information.

8-2. PREPARATION.

Explosives drivers shall be provided with emergency response/firefighting information (i.e. safe operating distances for firefighters, safe evacuation distances, etc.) appropriate to the specific loads they are transporting. This information is annotated on bill of lading, or on the DD Form 2890 (figure 3-13) for military or government drivers transporting A&E within CONUS. The North American Emergency Response Guidebook (ERG) guidesheet applicable to the A&E being transported must be attached to the DD Form 2890. Explosives drivers shall read, sign and carry these instructions with them at all times from point of origin to destination. Additionally, drivers shall know the content of the load, be aware of the hazards, and have knowledge of the following:

a. Type of cargo, number of packages, total weight.

b. Hazard Class and Division, Compatibility Group, UN Number, Proper Shipping Name, and Net Explosive Weight (NEW).

c. Required placards.

d. Safe driving regulations, i.e. safe following distances, restriction against use of flame-producing devices and smoking, proper refueling practices, parking regulations, etc.

e. Warning instructions.

f. Emergency response telephone numbers.

8-3. FIRE PREVENTION.

Explosives drivers shall exert every effort to prevent fires in vehicles transporting A&E. Therefore, drivers shall adhere to all rules and regulations concerning the following:

a. Use of plastic bedliners. (See "WARNING" after paragraph 4-2.)

b. Convoy distances. (See paragraph 5-2.9.3.)

c. Flame-producing devices. (See paragraph 5-4.1.)

d. Refueling. (See paragraph 5-12).

e. Safe driving. (See paragraphs 5-2.6 and 8-4.)

f. Smoking. (See paragraph 5-4.2.)

g. Vehicle inspection. (See paragraph 4-4.)

h. Parking. (See paragraphs 5-13 and 8-4.)

8-4. PASSING FIRES ALONG THE HIGHWAY.

Motor vehicles transporting arms, ammunition, explosives and related hazardous materials (AA&E) shall not be driven past fires of any kind burning on or near the highway until the driver has determined that the passing can be made safely and without stopping (300 feet or more). A motor vehicle containing AA&E must not be parked within 300 feet of an open fire.

8-5. FIRE EXTINGUISHERS.

8-5.1. SPECIFICATIONS.

a. Each motor vehicle loaded with ammunition, explosives and related hazardous material shall be equipped with one fully charged Underwriters' Laboratory (UL) fire extinguisher with a rating of 10-B:C or greater capacity, securely mounted and readily accessible. The extinguisher shall use a non-freezing extinguishing agent 10-pound dry chemical or other non-toxic vapor type with equivalent extinguishing capacity.

b. When all stock of extinguishers filled with carbon dioxide (CO_2) are exhausted, use of a Purple-K (PKP), dry chemical extinguisher is required. The PKP dry chemical extinguisher is stocked under NSN 9C 4210-00-808-4544. Halon 1211 portable fire extinguisher shall not be used.

8-5.2. USE. Drivers shall be instructed as to the care, inspection and use of installed portable dry chemical fire extinguishers. National Fire Protection Association (NFPA) 10 provides instructions on the care and use of portable fire extinguishers; NFPA 17 provides instructions on dry chemical extinguishing systems. Maintenance and inspection of portable fire extinguishers shall be coordinated through individual activity fire departments.

NOTE

The guidelines outlined above follow those presented in 49 CFR 393.95, which require one fire extinguisher per vehicle transporting AA&E. It is the policy of the Department of the Navy (DON) to follow these guidelines for all DON shipments of AA&E.

8-6. FIREFIGHTING PROCEDURES.

Should a fire occur on a vehicle carrying AA&E, the driver shall park the vehicle as far from the highway and as far removed from a congested area as possible. Figures 8-1 and 8-2 provide a summary of DD Form 2890 emergency response information for Class/Division 1.1 through 1.6 A&E. The following firefighting procedures shall be strictly followed.

8-6.1. VEHICLE FIRES. If any part of the vehicle (other than the actual cargo) catches fire, the driver shall use the hand extinguisher immediately and attempt to extinguish the fire. The driver shall make every effort to prevent the fire from reaching the cargo.

WARNING

Do not attempt to fight any fire that has reached the cargo area.

8-6.2. CARGO FIRES. If the cargo does catch fire (or if fire in any part of the vehicle cannot be controlled with the equipment on hand); the driver shall not attempt to fight the fire. The driver shall withdraw from the area, and take the following action in accordance with the emergency response procedures outlined on the shipping papers.

a. Call the emergency response telephone number on the shipping papers first. Notify police and fire departments. Upon their arrival, furnish the specific emergency response instructions provided on the shipping papers, or on the DD Form 2890.

b. Warn the public and evacuate any persons from the area in accordance with the approach distances specified on the shipping papers.

POTENTIAL HAZARDS

FIRE OR EXPLOSION:
--MAY EXPLODE AND THROW FRAGMENTS 1 MILE OR MORE IF FIRE REACHES CARGO.

HEALTH HAZARDS:
--Fire may produce irritating, corrosive and/or toxic gases.

PUBLIC SAFETY

--CALL EMERGENCY RESPONSE TELEPHONE NUMBER ON SHIPPING PAPER FIRST. IF SHIPPING PAPER IS NOT AVAILABLE OR THERE IS NO ANSWER; CALL U.S. ARMY OPERATIONS CENTER AT (703) 697-0218 (for explosives ammunition incidents) OR DEFENSE LOGISTICS AGENCY AT (800)851-8061 (for all other dangerous good incidents).

--Isolate spill or leak area immediately for at least 1/3 mile in all directions.
--Move people out of line of sight of the scene and away from windows.
--Keep unauthorized personnel away.
--Stay upwind.
--Ventilate closed spaces before entering.

PROTECTIVE CLOTHING:

--Wear positive pressure self-contained breathing apparatus (SCBA).
--Structural firefighters' protective clothing will only provide limited protection.

EVACUATION:

--Large Spill - Consider initial evacuation for 1/2 mile in all directions.
--Fire - If rail car or trailer is involved in a fire, isolate for 1 mile in all directions. Also, initiate evacuation emergency responders for 1 mile in all directions.

FIRES:
--CARGO FIRES: DO NOT FIGHT FIRE WHEN IT REACHES CARGO! CARGO MAY EXPLODE! Stop all traffic and clear the area for at least 1 mile in all directions and let fire burn. Do not move cargo or vehicle if cargo has been exposed to heat.
--TIRE OR VEHICLE FIRES: USE PLENTY OF WATER -- FLOOD IT! IF WATER IS NOT AVAILABLE, USE CO_2 DRY CHEMCIAL, OR DIRT. If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area. Pay special attention to tire fires, as re-ignition may occur. Stand by with extinguisher ready.

SPILL OR LEAK:
--Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).
--All equipment used when handling the product must be grounded.
--Do not touch or walk through spilled material.
--DO NOT OPERATE RADIO TRANSMITTERS WITHIN 330 FEET OF ELECTRIC DETONATORS.
--DO NOT CLEAN UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRST AID:
--Move victim to fresh air.
--Call 911 or emergency medical service.
--Give artificial respiration if victim is not breathing.
--Administer oxygen if breathing is difficult.
--Remove and isolate contaminated clothing and shoes.
--In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
--Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

FIGURE 8-1. Summary of Emergency Response Information, Class/Division 1.1, 1.2, 1.3, 1.5 or 1.6 Explosives

POTENTIAL HAZARDS

FIRE OR EXPLOSION:

--MAY EXPLODE AND THROW FRAGMENTS 1/3 MILE OR MORE IF FIRE REACHES CARGO.

HEALTH HAZARDS:

--Fire may produce irritating, corrosive and/or toxic gases.

PUBLIC SAFETY

--CALL EMERGENCY RESPONSE TELEPHONE NUMBER ON SHIPPING PAPER FIRST. IF SHIPPING PAPER IS NOT AVAILABLE OR THERE IS NO ANSWER; CALL U.S. ARMY OPERATIONS CENTER AT (703) 697-0218 (for explosives ammunition incidents) OR DEFENSE LOGISTICS AGENCY AT (800) 851-8061 (for all other dangerous goods incidents).

--Isolate spill or leak area immediately for at least 330 feet in all directions.
--Move people out of line of sight of the scene and away from windows.
--Keep unauthorized personnel away.
--Stay upwind.
--Ventilate closed spaces before entering.

PROTECTIVE CLOTHING:

--Wear positive pressure self-contained breathing apparatus (SCBA).
--Structural firefighters' protective clothing will only provide limited protection.

EVACUATION:

--Large Spill -- Consider initial evacuation for 800 feet in all directions.
--Fire -- If rail car or trailer is involved in a fire, isolate for 1/3 mile in all directions. Also, initiate evacuation including emergency responders for 1/3 mile in all directions.

FIRES:

--CARGO FIRES: DO NOT FIGHT FIRE WHEN IT REACHES CARGO! CARGO MAY EXPLODE! Stop all traffic and clear the area for at least 1/3 mile in all directions and let fire burn. Do not move cargo or vehicle if cargo has been exposed to heat.
--TIRE OR VEHICLE FIRES: USE PLENTY OF WATER -- FLOOD IT! IF WATER IS NOT AVAILABLE, USE CO_2 DRY CHEMICAL, OR DIRT. If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area. Pay special attention to tire fires, as re-ignition may occur. Stand by with extinguisher ready.

SPILL OR LEAK:

--Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).
--All equipment used when handling the product must be grounded.
--Do not touch or walk through spilled material.
--DO NOT OPERATE RADIO TRANSMITTERS WITHIN 330 FEET OF ELECTRIC DETONATORS.
--DO NOT CLEAN UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRST AID:

--Move victim to fresh air.
--Call 911 or emergency medical service.
--Give artificial respiration if victim is not breathing.
--Administer oxygen if breathing is difficult.
--Remove and isolate contaminated clothing and shoes.
--In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
--Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

SUPPLEMENTAL INFORMATION:

--Packages bearing the 1.4S label or packages containing material classified as 1.4S are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projections of fragments.
--Effects are usually confined to immediate vicinity of packages.
--If fire threatens cargo area containing packages bearing the 1.4S label or packages containing material classified as 1.4S, consider isolating at least 50 feet in all directions.
--Fight fire with normal precautions from a reasonable distance.

FIGURE 8-2. Summary of Emergency Response Information, Class/Division 1.4 Explosives

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APPENDIX B

GENERAL INSTRUCTIONS FOR COMPLETION OF MOTOR VEHICLE ACCIDENT REPORT, STANDARD FORM (SF) 91

B-1. INTRODUCTION.

This appendix provides detailed instructions on the correct preparation of the Motor Vehicle Accident Report, SF 91. This form is divided into 13 sections, and is illustrated in figure 3-17.

SECTION I - FEDERAL VEHICLE DATA

1. Driver's Name. The driver shall print full name.

2. Driver's License No./State/Limitations. Enter the state permit number, not the government permit number. This applies to both military and civilian drivers.

3. Date of Accident. Enter the day, month and year.

4a. Department/Federal Agency Permanent Office Address. The driver will enter the name and location of the organization to which assigned.

4b. Work Telephone Number. The driver will enter the telephone number of place of employment.

5. Tag or Identification Number. Enter the vehicle license number or vehicle ID #.

6. Estimated Repair Cost. The driver shall provide an estimate of what it would cost to have the vehicle repaired.

7. Year of Vehicle. This information is located on the registration card or trip ticket, or inside of the driver's door on the data place.

8. Make of Vehicle. Enter the make of the vehicle, i.e. Ford, Dodge, Chevy, etc.

9. Model of Vehicle. Enter the model of the vehicle, i.e. F150, Taurus, etc.

10. Seat Belts Used. Were the driver and passenger wearing seat belts? Answer Yes or No.

11. Describe Vehicle Damage. List the parts of the vehicle that were damaged. Begin with the major damage and include all other damage, no matter how small. Example: LEFT FRONT FENDER DENTED SLIGHTLY.

SECTION II - OTHER VEHICLE DATA

12. Driver's Name. Enter the full name of the driver of the other vehicle.

13. Social Security No./Tax Identification No. Enter social security number or tax identification number for the driver of the other vehicle.

14. Driver's License Number/State/Limitations. Enter the license number, state of issue, and any restrictions or limitations noted on the license of the other driver.

15a. Driver's Work Address. Enter the work address of the driver of the other vehicle (city, state and zip).

15b. Work Telephone Number. Enter the other driver's work telephone number including area code.

16a. Driver's Home Address. Enter the home address of the driver of the other vehicle (city, state and zip).

16b. Driver's Home Telephone Number. Enter the other driver's home telephone number including area code.

17. Describe Vehicle Damage. List the parts of the vehicle other driver's that were damaged. Begin with the major damage and include all other damage, no matter how small. Example: LEFT REAR FENDER AND BUMPER DENTED SLIGHTLY.

18. Estimated Repair Cost. The driver shall provide an estimate of cost to have the other vehicle repaired.

19. Year of Vehicle. This information is found on the registration card or inside the driver's door on the data plate of the other vehicle.

20. Make of Vehicle. Enter the make of the other vehicle, i.e. Ford, Dodge, Chevy, etc.

21. Model of Vehicle. Enter the model of the other vehicle, i.e. F150, Taurus, etc.

22. Tag Number and State. This information should be obtained from the vehicle registration card and verified to be the same as the license tag on the other vehicle.

23a. Driver's Insurance Company Name and Address. Provide the name and address of the other vehicle's insurance provider. If federal, state or local government, list political subdivision and agency.

23b. Policy Number. Enter the number of the insurance policy covering the other vehicle.

23c. Telephone Number. Enter the telephone number of the insurance provider for the other vehicle.

24. Vehicle Is: Check appropriate box.

25a. Owner's Name(s). If same as driver, state SAME AS DRIVER.

25b. Telephone Number. Owner's telephone number.

26. Owner's Address(es). If same as driver, state SAME AS DRIVER. Otherwise list full address as it appears on registration.

SECTION III - KILLED OR INJURED

27. Name. State the full name of the injured or deceased person(s).

28. Sex. State the sex of the injured or deceased person(s).

29. Date of Birth. Provide the date of birth of the injured or deceased person(s).

30. Address. Provide the full address of the injured or deceased person(s).

31. Mark "X" in Appropriate Boxes. Mark those which apply.

32. In Which Vehicle. Vehicle in which the injured or deceased person was riding.

33. Location in Vehicle. Location in which the injured or deceased person was riding prior to the accident.

34. First Aid Given By. Name of individual(s) or organization providing first aid to the injured person(s).

35. Transported By. Organization transporting injured person(s).

36. Transported To. Location to which injured person(s) was transported for medical treatment.

37. Same as 27.

38. Same as 28.

39. Same as 29.

40. Same as 30.

41. Same as 31.

42. Same as 32.

43. Same as 33.

44. Same as 34.

45. Same as 35.

46. Same as 36.

47a. Name of Street or Highway. Give the name and route number of the street or highway on which the accident occurred and of the nearest cross street or landmark.

47b. Direction of Pedestrian. Direction in which pedestrian was walking, give landmarks, if possible (from and to blocks).

47c. Describe What Pedestrian Was Doing at the Time of Accident. Give all pertinent information.

SECTION IV - ACCIDENT TIME AND LOCATION

48. Date of Accident. Date the accident occurred.

49. Place of Accident. Location of accident (street address, city, state, zip code, distance to nearest intersection, nearest landmark, kind of locality (industrial, business, residential, open country, etc.), road description (highway, state road, etc.).

50. Time of Accident. Time the accident occurred (a.m., p.m.).

51. Indicate on This Diagram. HOW THE ACCIDENT HAPPENED. Use symbols and arrows to describe and sketch the scene of the accident. Include landmarks.

52. Point of Impact. (Check one box for each vehicle). Check box describing where impact occurred on each vehicle.

53. Describe What Happened. Give all pertinent information.

SECTION V - WITNESS/PASSENGER

54. Name. Enter name of witness.

55. Work Telephone Number. Enter work telephone number of witness.

56. Home Telephone Number. Enter home telephone number of witness.

57. Work Address. Enter business/work address of witness.

58. Home Address. Enter home address of witness.

59. Name. Enter name of second witness.

60. Work Telephone Number. Enter work telephone number of second witness.

61. Home Telephone Number. Enter home telephone number of second witness.

62. Work Address. Enter business/work address of second witness.

63. Home Address. Enter home address of second witness.

SECTION VI - PROPERTY DAMAGE

64a. Name of Owner. Enter name of owner of property (other than vehicles) which was damaged.

64b. Work Telephone Number. Enter office/work telephone number of owner of damaged property.

64c. Home Telephone Number. Enter home telephone number of owner of damaged property.

64d. Work Address. Enter business/work address of owner of damaged property.

64e. Home Address. Enter home address of owner of damaged property.

65a. Name of Insurance Company. Name and address of the insurance provider covering the property which was damaged. If federal, state or local government, list political subdivision and agency.

65b. Telephone Number. Telephone number of insurance provider.

65c. Policy Number. Insurance policy number of insurance covering damaged property.

66. Item Damaged. Describe item which was damaged.

67. Location of Damaged Item. Current physical location of damaged item.

68. Estimated Cost. Estimate of repair cost or replacement of damaged item.

SECTION VII - POLICE INFORMATION

69a. Name of Police Officer. Enter name of police officer working the accident.

69b. Badge Number. Enter badge number of police officer working accident.

69c. Telephone Number. Enter work telephone number of police office working accident.

70. Precinct or Headquarters. Enter name of the police station to which the officer working the accident reports. Include name of department and address.

71a. Person Charged with Accident. Enter the name of the person who was charged with any violation in connection with the accident.

71b. Violation(s). Enter violation(s) for which the individual was charged.

SECTION VIII - EXTRA DETAILS

Use this area for continuation of any blocks or additional information. If a block is continued, be sure to annotate the block number.

NOTE

Please review Privacy Act Statement

SECTION IX - FEDERAL DRIVER CERTIFICATION

72a. Name and Title of Driver. PRINT your full name and your title.

72b. Driver's Signature and Date. After reviewing the completed form and the certification statement, place your legal signature and the date signed in this block.

SECTION X - DETAILS OF TRIP DURING WHICH ACCIDENT OCCURRED

73 thru 83c. Shall be completed by the driver's supervisor. These blocks are self-explanatory.

SECTION XI - ACCIDENT INVESTIGATION DATA

SECTION XII - ATTACHMENTS

SECTION XIII - COMMENTS/APPROVALS

84 thru 89f. Shall be completed by the Accident Investigator.

90a thru 90f. Prior to completion of these blocks, the accident reviewing official shall review the entire SF 91. Following review, the reviewing official shall complete blocks 90a thru 90f.

Please click here for the latest Revision of Title 49 CFR Part 397

APPENDIX C

TITLE 49 CFR PART 397
TRANSPORTATION OF HAZARDOUS MATERIALS; DRIVING AND PARKING RULES
Revised 1 October 2011

SUBPART A - GENERAL

Sec.

397.1 Application of the rules in this part.
397.2 Compliance with Federal motor carrier safety regulations.
397.3 State and local laws, ordinances, and regulations.
397.5 Attendance and surveillance of motor vehicles.
397.7 Parking.
397.9 [Reserved].
397.11 Fires.
397.13 Smoking.
397.15 Fueling.
397.17 Tires.
397.19 Instructions and documents.

SUBPART B [RESERVED]

SUBPART C - ROUTING OF NON-RADIOACTIVE HAZARDOUS MATERIALS

Sec.

397.61 Purpose and scope.
397.63 Applicability.
397.65 Definitions.
397.67 Motor carrier responsibility for routing.
397.69 Highway routing designations; preemption.
397.71 Federal standards.
397.73 Public information and reporting requirements.
397.75 Dispute resolution.
397.77 Judicial review of dispute decision.

SUBPART D - ROUTING OF CLASS 7 (RADIOACTIVE) MATERIALS

Sec.

397.101 Requirements for motor carriers and drivers.
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Sec.

397.201 Purpose and scope of the procedures.
397.203 Standards for determining preemption.
397.205 Preemption application.
397.207 Preemption notice.
397.209 Preemption processing.
397.211 Preemption determination.
397.213 Waiver of preemption application.
397.215 Waiver notice.
397.217 Waiver processing.
397.219 Waiver determination and order.
397.221 Timeliness.
397.223 Petition for reconsideration.
397.225 Judicial review.

Authority: 49 U.S.C. 322; 49 CFR 1.73 Subpart A also issued under 49 U. S. C. 5103, 31136, 31502, and 49 CFR 153 Subparts C, D, and E also issued under 49 U.S.C. 5112, 5125.

Source: 36 FR 4876, Mar. 13, 1971, unless otherwise noted.

* Editorial Note: Nomenclature changes to Part 397 appear at 66 FR 49874, 1 Oct 2001

SUBPART A - GENERAL

397.1 Application of the rules in this part.

(a) The rules in this part apply to each motor carrier engaged in the transportation of hazardous materials by a motor vehicle which must be marked or placarded in accordance with Part 177.823 of this title and to-

(1) Each officer or employee of the motor carrier who performs supervisory duties related to the transportation of hazardous materials; and

(2) Each person who operates or who is in charge of a motor vehicle containing hazardous materials.

(b) Each person designated in paragraph (a) of this section must know and obey the rules in this part.

[36 FR 4876, Mar. 13, 1971, as amended at 36 FR 16067, Aug. 19, 1971; 53 FR 18058, May 19, 1988; 60 FR 38749, July 28, 1995]

397.2 Compliance with Federal motor carrier safety regulations.

A motor carrier or other person to whom this part is applicable must comply with the rules in Parts 390 through 397, inclusive, of this subchapter when he/she is transporting hazardous materials by a motor vehicle which must be marked or placarded in accordance with Part 177.823 of this title.

[37 FR 18080, Sept. 7, 1972]

397.3 State and local laws, ordinances, and regulations.

Every motor vehicle containing hazardous materials must be driven and parked in compliance with the laws, ordinances, and regulations of the jurisdiction in which it is being operated, unless they are at variance with specific regulations of the Department of Transportation which are applicable to the operation of that vehicle and which impose a more stringent obligation or restraint.

397.5 Attendance and surveillance of motor vehicles.

(a) Except as provided in paragraph (b) of this section, a motor vehicle which contains a Division 1.1, 1.2, or 1.3 (explosive) material must be attended at all times by its driver or a qualified representative of the motor carrier that operates it.

(b) The rules in paragraph (a) of this section do not apply to a motor vehicle which contains Division 1.1, 1.2, or 1.3 material if all the following conditions exist-

(1) The vehicle is located on the property of a motor carrier, on the property of a shipper or consignee of the explosives, in a safe haven, or, in the case of a vehicle containing 50 pounds or less of a Division 1.1, 1.2, or 1.3 material, on a construction or survey site; and

(2) The lawful bailee of the explosives is aware of the nature of the explosives the vehicle contains and has been instructed in the procedures which must be followed in emergencies; and

(3) The vehicle is within the bailee's unobstructed field of view or is located in a safe haven.

(c) A motor vehicle which contains hazardous materials other than Division 1.1, 1.2, or 1.3 materials, and which is located on a public street or highway, or the shoulder of a public highway, must be attended by its driver. However, the vehicle need not be attended while its driver is performing duties which are incident and necessary to the driver's duties as the operator of the vehicle.

(d) For purposes of this section-

(1) A motor vehicle is attended when the person in charge of the vehicle is on the vehicle, awake, and not in a sleeper berth, or is within 100 feet of the vehicle and has it within his/her unobstructed field of view.

(2) A qualified representative of a motor carrier is a person who-

(i) Has been designated by the carrier to attend the vehicle;

(ii) Is aware of the nature of the hazardous materials contained in the vehicle he/she attends;

(iii) Has been instructed in the procedures he/she must follow in emergencies; and

(iv) Is authorized to move the vehicle and has the means and ability to do so.

(3) A safe haven is an area specifically approved in writing by local, State, or Federal governmental authorities for the parking of unattended vehicles containing Division 1.1, 1.2, or 1.3 materials.

(e) The rules in this section do not relieve the driver from any obligation imposed by law relating to the placing of warning devices when a motor vehicle is stopped on a public street or highway.

[59 FR 63925, Dec. 12, 1994]

397.7 Parking.

(a) A motor vehicle which contains Division 1.1, 1.2, or 1.3 materials must not be parked under any of the following circumstances-

(1) On or within 5 feet of the traveled portion of a public street or highway;

(2) On private property (including premises of fueling or eating facilities) without the knowledge and consent of the person who is in charge of the property and who is aware of the nature of the hazardous materials the vehicle contains; or

(3) Within 300 feet of a bridge, tunnel, dwelling, or place where people work, congregate, or assemble, except for brief periods when the necessities of operation require the vehicle to be parked and make it impracticable to park the vehicle in any other place.

(b) A motor vehicle which contains hazardous materials other than Division 1.1, 1.2, or 1.3 materials must not be parked on or within five feet of the traveled portion of a public street or highway except for brief periods when the necessities of operation require the vehicle to be parked and make it impracticable to park the vehicle in any other place.

[59 FR 63925, Dec. 12, 1994]

397.9 [Reserved]

397.11 Fires.

(a) A motor vehicle containing hazardous materials must not be operated near an open fire unless its driver has first taken precautions to ascertain that the vehicle can safely pass the fire without stopping.

(b) A motor vehicle containing hazardous materials must not be parked within 300 feet of an open fire.

397.13 Smoking.

No person may smoke or carry a lighted cigarette, cigar, or pipe on or within 25 feet of-

(a) A motor vehicle which contains Class 1 materials, Class 5 materials, or flammable materials classified as Division 2.1, Class 3, Divisions 4.1 or 4.2; or

(b) An empty tank motor vehicle which has been used to transport Class 3, flammable materials, or Division 2.1 flammable gases, which when so used, was required to be marked or placarded in accordance with the rules in Part 177.823 of this title.

[59 FR 63925, Dec. 12, 1994]

397.15 Fueling.

When a motor vehicle which contains hazardous materials is being fueled-

(a) Its engine must not be operating; and

(b) A person must be in control of the fueling process at the point where the fuel tank is filled.

397.17 Tires.

(a) A driver must examine each tire on a motor vehicle at the beginning of each trip and each time the vehicle is parked.

(b) If, as the result of an examination pursuant to paragraph (a) of this section, or otherwise, a tire is found to be flat, leaking, or improperly inflated, the driver must cause the tire to be repaired, replaced, or properly inflated before the vehicle is driven. However, the vehicle may be driven to the nearest safe place to perform the required repair, replacement, or inflation.

(c) If, as the result of an examination pursuant to paragraph (a) of this section, or otherwise, a tire is found to be overheated, the driver shall immediately cause the overheated tire to be removed and placed at a safe distance from the vehicle. The driver shall not operate the vehicle until the cause of the overheating is corrected.

(d) Compliance with the rules in this section does not relieve a driver from the duty to comply with the rules in Parts 397.5 and 397.7.

397.19 Instructions and documents.

(a) A motor carrier that transports Division 1.1, 1.2, or 1.3 (explosive) materials must furnish the driver of each motor vehicle in which the explosives are transported with the following documents:

(1) A copy of the rules in this part;

(2) [Reserved]

(3) A document containing instructions on procedures to be followed in the event of an accident or delay. The documents must include the names and telephone numbers of persons (including representatives of carriers or shippers) to be contracted, the nature of the explosives being transported, and the precautions to be taken in emergencies such as fires, accidents, or leakages.

(b) A driver who receives documents in accordance with paragraph (a) of this section must sign a receipt for them. The motor carrier shall maintain the receipt for a period of one year from the date of signature.

(c) A driver of a motor vehicle which contains Division 1.1, 1.2, or 1.3 materials must be in possession of, be familiar with, and be in compliance with-

(1) The documents specified in paragraph (a) of this section;

(2) The documents specified in Part 177.817 of this title; and;

(3) The written route plan specified in Part 397.67.

[59 FR 53925, Dec. 12, 1994, as amended at 63 FR 33280, June 18, 1998]

SUBPART B [RESERVED]

SUBPART C - ROUTING OF NON-RADIOACTIVE HAZARDOUS MATERIALS

Source: 59 FR 51830, Oct. 12, 1994, unless otherwise noted.

397.61 Purpose and scope.

This subpart contains routing requirements and procedures that States and Indian tribes are required to follow if they establish, maintain, or enforce routing designations over which a non-radioactive hazardous material (NRHM) in a quantity which requires placarding may or may not be transported by a motor vehicle. It also provides regulations for motor carriers transporting placarded or marked NRHM and procedures for dispute resolutions regarding NRHM routing designations.

397.63 Applicability.

The provisions of this subpart apply to any State or Indian tribe that establishes, maintains, or enforces any routing designations over which NRHM may or may not be transported by motor vehicle. They also apply to any motor carrier that transports or causes to be transported placarded or marked NRHM in commerce.

397.65 Definitions.

For purposes of this subpart, the following definitions apply:

Administrator. The Federal Motor Carrier Safety Administrator, who is the chief executive of the Federal Motor Carrier Safety Administration, an agency within the United States Department of Transportation, or his/her designate.

Commerce. Any trade, traffic, or transportation in the United States which:

(1) Is between a place under the jurisdiction of a State or Indian tribe and any place outside of such jurisdiction; or

(2) Is solely within a place under the jurisdiction of a State or Indian tribe but which affects trade, traffic, or transportation described in subparagraph (a).

FMCSA. The Federal Motor Carrier Safety Administration, an agency within the Department of Transportation.

Hazardous Material. A substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, or property when transported in commerce, and which has been so designated.

Indian tribe. Has the same meaning as contained in Section 4 of the Indian Self-Determination and Education Act, 25 U.S.C. 450b.

Motor carrier. A for-hire motor carrier or a private motor carrier of property. The term includes a motor carrier's agents, officers and representatives as well as employees responsible for hiring, supervising, training, assigning, or dispatching of drivers.

Motor vehicle. Any vehicle, machine, tractor, trailer, or semitrailer propelled or drawn by mechanical power and used upon the highways in the transportation of passengers or property, or any combination thereof.

NRHM. A non-radioactive hazardous material transported by motor vehicle in types and quantities which require placarding, pursuant to Table 1 or 2 of 49 CFR 172.504.

Political subdivision. A municipality, public agency or other instrumentality of one or more States, or a public corporation, board, or commission established under the laws of one or more States.

Radioactive material. Any material having a specific activity greater than 0.002 microcuries per gram (uCi/g), as defined in 49 CFR 173.403.

Routing agency. The State highway agency or other State agency designated by the Governor of that State, or an agency designated by an Indian tribe, to supervise, coordinate, and approve the NRHM routing designations for that State or Indian tribe.

Routing designations. Any regulation, limitation, restriction, curfew, time of travel restriction, lane restriction, routing ban, port-of-entry designation, or route weight restriction, applicable to the highway transportation of NRHM over a specific highway route or portion of a route.

Secretary. The Secretary of Transportation.

State. A State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Virgin Islands, American Samoa or Guam.

397.67 Motor carrier responsibility for routing.

(a) A motor carrier transporting NRHM shall comply with NRHM routing designations of a State or Indian tribe pursuant to this subpart.

(b) A motor carrier carrying hazardous materials required to be placarded or marked in accordance with 49 CFR 177.823 and not subject to a NRHM routing designation pursuant to this subpart, shall operate the vehicle over routes which do not go through or near heavily populated areas, places where crowds are assembled, tunnels, narrow streets or alleys, except where the motor carrier determines that:

(1) There is no practicable alternative;

(2) A reasonable deviation is necessary to reach terminals, points of loading and unloading, facilities for food, fuel, repairs, rest, or a safe haven; or

(3) A reasonable deviation is required by emergency conditions, such as a detour that has been established by a highway authority, or a situation exists where a law enforcement official requires the driver to take an alternative route.

(c) Operating convenience is not a basis for determining whether it is practicable to operate a motor vehicle in accordance with paragraph (b) of this section.

(d) Before a motor carrier requires or permits a motor vehicle containing explosives in Class 1, Divisions 1.1, 1.2, 1.3, as defined in 49 CFR 173.50 and 173.53 respectively, to be operated, the carrier or its agent shall prepare a written route plan that complies with this section and shall furnish a copy to the driver. However, the driver may prepare the written plan as agent for the motor carrier when the trip begins at a location other than the carrier's terminal.

397.69 Highway routing designations; preemption.

(a) Any State or Indian tribe that establishes or modifies a highway routing designation over which NRHM may or may not be transported on or after November 14, 1994, and maintains or enforces such designation, shall comply with the highway routing standards set forth in Part 397.71 of this subpart. For purposes of this subpart, any highway routing designation affecting the highway transportation of

NRHM, made by a political subdivision of a State is considered as one made by that State, and all requirements of this subpart apply.

(b) Except as provided in Parts 397.75 and 397.219, a NRHM route designation made in violation of paragraph (a) of this section is preempted pursuant to section 105(b)(4) of the Hazardous Materials Transportation Act (49 U.S.C. app. 1804(b)(4)). This provision shall become effective after November 14, 1996.

(c) A highway routing designation established by a State, political subdivision, or Indian tribe before November 14, 1994 is subject to preemption in accordance with the preemption standards in paragraphs (a)(1) and (a)(2) of Part 397.203 of this subpart.

(d) A State, political subdivision, or Indian tribe may petition for a waiver of preemption in accordance with Part 397.213.

397.71 Federal standards.

(a) A State or Indian tribe shall comply with the Federal standards under paragraph (b) of this section when establishing, maintaining, or enforcing specific NRHM routing designations over which NRHM may or may not be transported.

(b) The Federal standards are as follows:

(1) *Enhancement of public safety.* The State or Indian tribe shall make a finding, supported by the record to be developed in accordance with paragraphs (b)(2)(ii) and (b)(3)(iv) of this section, that any NRHM routing designation enhances public safety in the areas subject to its jurisdiction and in other areas which are directly affected by such highway routing designation. In making such a finding, the State or Indian tribe shall consider:

(i) The factors listed in paragraph (b)(9) of this section; and

(ii) The DOT "Guidelines for Applying Criteria to Designate Routes for Transporting Hazardous Materials," DOT/RSPA/OHMT-89-02, July 1989[1] or its most current version; or an equivalent routing analysis which adequately considers overall risk to the public.

(2) *Public participation.* Prior to the establishment of any NRHM routing designation, the State or Indian tribe shall undertake the following actions to ensure participation by the public in the routing process:

(i) The State or Indian tribe shall provide the public with notice of any proposed NRHM routing designation and a 30-day period in which to comment. At any time during this period or following review of the comments received, the State or Indian tribe shall decide whether to hold a public hearing on the proposed NRHM route designation. The public shall be given 30 days prior notice of the public hearing which shall be conducted as described in paragraph (b)(2)(ii) of this section. Notice for both the comment period and the public hearing, if one is held, shall be given by publication in at least two newspapers of general circulation in the affected area or areas and shall contain a complete description of the proposed routing designation, together with the date, time, and location of any public hearings. Notice for both the comment period and any public hearing may also be published in the official register of the State.

(ii) If it is determined that a public hearing is necessary, the State or Indian tribe shall hold at least one public hearing on the record during which the public will be afforded the opportunity to present their views and any information or data related to the proposed NRHM routing designation. The State shall make available to the public, upon payment of prescribed costs, copies of the transcript of the hearing, which shall include all exhibits and documents presented during the hearing or submitted for the record.

[1] This document may be obtained from Office of Enforcement and Compliance (MC-EC), Federal Motor Carrier Safety Administration, U.S. Department of Transportation, 1200 New Jersey Ave., SE., Washington, DC 20590-0001.

(3) *Consultation with others.* Prior to the establishment of any NRHM routing designation, the State or Indian tribe shall provide notice to, and consult with, officials of affected political subdivisions, States and Indian tribes, and any other affected parties. Such actions shall include the following:

(i) At least 60 days prior to establishing a routing designation, the State or Indian tribe shall provide notice, in writing, of the proposed routing designation to officials responsible for highway routing in all other affected States or Indian tribes. A copy of this notice may also be sent to all affected political subdivisions. This notice shall request approval, in writing, by those States or Indian tribes, of the proposed routing designations. If no response is received within 60 days from the day of receipt of the notification of the proposed routing designation, the routing designation shall be considered approved by the affected State or Indian tribe.

(ii) The manner in which consultation under this paragraph is conducted is left to the discretion of the State or Indian tribe.

(iii) The State or Indian tribe shall attempt to resolve any concern or disagreement expressed by any consulted official related to the proposed routing designation.

(iv) The State or Indian tribe shall keep a record of the names and addresses of the officials notified pursuant to this section and of any consultation or meeting conducted with these officials or their representatives. Such record shall describe any concern or disagreement expressed by the officials and any action undertaken to resolve such disagreement or address any concern.

(4) *Through routing.* In establishing any NRHM routing designation, the State or Indian tribe shall ensure through highway routing for the transportation of NRHM between adjacent areas. The term "through highway routing" as used in this paragraph means that the routing designation must ensure continuity of movement so as to not impede or unnecessarily delay the transportation of NRHM. The State or Indian tribe shall utilize the procedures established in paragraphs (b)(2) and (b)(3) of this section in meeting these requirements. In addition, the State or Indian tribe shall make a finding, supported by a risk analysis conducted in accordance with paragraph (b)(1) of this section, that the routing designation enhances public safety. If the risk analysis shows-

(i) That the current routing presents at least 50 percent more risk to the public than the deviation under the proposed routing designation, then the proposed routing designation may go into effect.

(ii) That the current routing presents a greater risk but less than 50 percent more risk to the public than the deviation under the proposed routing restriction, then the proposed routing restriction made by a State or Indian tribe shall only go into effect if it does not force a deviation of more than 25 miles or result in an increase of more than 25 percent of that part of a trip affected by the deviation, whichever is shorter, from the most direct route through a jurisdiction as compared to the intended deviation.

(iii) That the current route has the same or less risk to the public than the deviation resulting from the proposed routing designation, then the routing designation shall not be allowed.

(5) *Agreement of other States; burden on commerce.* Any NRHM routing designation which affects another State or Indian tribe shall be established, maintained, or enforced only if:

(i) It does not unreasonably burden commerce, and

(ii) It is agreed to by the affected State or Indian tribe within 60 days of receipt of the notice sent pursuant to paragraph (b)(3)(i) of this section, or it is approved by the Administrator pursuant to Part 397.75.

(6) *Timeliness.* The establishment of a NRHM routing designation by any State or Indian tribe shall be completed within 18 months of the notice given in either paragraph (b)(2) or (b)(3) of this section, whichever occurs first.

(7) *Reasonable routes to terminals and other facilities.* In establishing or providing for reasonable access to and from designated routes, the State or Indian tribe shall use the shortest practicable route considering the factors listed in paragraph (b)(9) of this section. In establishing any NRHM routing designation, the State or Indian tribe shall provide reasonable access for motor vehicles transporting NRHM to reach:

(i) Terminals,

(ii) Points of loading, unloading, pickup and delivery, and

(iii) Facilities for food, fuel, repairs, rest, and safe havens.

(8) *Responsibility for local compliance.* The States shall be responsible for ensuring that all of their political subdivisions comply with the provisions of this subpart. The States shall be responsible for resolving all disputes between such political subdivisions within their jurisdiction. If a State or any political subdivision thereof, or an Indian tribe chooses to establish, maintain, or enforce any NRHM routing designation, the Governor, or Indian tribe, shall designate a routing agency for the State or Indian tribe, respectively. The routing agency shall ensure that all NRHM routing designations within its jurisdiction comply with the Federal standards in this section. The State or Indian tribe shall comply with the public information and reporting requirements contained in Part 397.73.

(9) *Factors to consider.* In establishing any NRHM routing designation, the State or Indian tribe shall consider the following factors:

(i) *Population density.* The population potentially exposed to a NRHM release shall be estimated from the density of the residents, employees, motorists, and other persons in the area, using United States census tract maps or other reasonable means for determining the population within a potential impact zone along a designated highway route. The impact zone is the potential range of effects in the event of a release. Special populations such as schools, hospitals, prisons, and senior citizen homes shall, among other things, be considered when determining the potential risk to the population along a highway routing. Consideration shall be given to the amount of time during which an area will experience a heavy population density.

(ii) *Type of highway.* The characteristics of each alternative NRHM highway routing designation shall be compared. Vehicle weight and size limits, underpass and bridge clearances, roadway geometrics, number of lanes, degree of access control, and median and shoulder structures are examples of characteristics which a State or Indian tribe shall consider.

(iii) *Types and quantities of NRHM.* An examination shall be made of the type and quantity of NRHM normally transported along highway routes which are included in a proposed NRHM routing designation, and consideration shall be given to the relative impact zone and risks of each type and quantity.

(iv) *Emergency response capabilities.* In consultation with the proper fire, law enforcement, and highway safety agencies, consideration shall be given to the emergency response capabilities which may be needed as a result of a NRHM routing designation. The analysis of the emergency response capabilities shall be based upon the proximity of the emergency response facilities and their capabilities to contain and suppress NRHM releases within the impact zones.

(v) *Results of consultation with affected persons.* Consideration shall be given to the comments and concerns of all affected persons and entities provided during public hearings and consultations conducted in accordance with this section.

(vi) *Exposure and other risk factors.* States and Indian tribes shall define the exposure and risk factors associated with any NRHM routing designations. The distance to sensitive areas shall be considered. Sensitive areas include, but are not limited to, homes and commercial buildings, special populations in hospitals, schools, handicapped facilities, prisons and stadiums; water sources such as streams and lakes; and natural areas such as parks, wetlands, and wildlife reserves.

(vii) *Terrain considerations.* Topography along and adjacent to the proposed NRHM routing designation that may affect the potential severity of an accident, the dispersion of the NRHM upon release and the control and clean-up of NRHM if released shall be considered.

(viii) *Continuity of routes.* Adjacent jurisdictions shall be consulted to ensure routing continuity for NRHM across common borders. Deviations from the most direct route shall be minimized.

(ix) *Alternative routes.* Consideration shall be given to the alternative routes to, or resulting from, any NRHM route designation. Alternative routes shall be examined, reviewed, or evaluated to the extent necessary to demonstrate that the most probable alternative routing resulting from a routing designation is safer than the current routing.

(x) *Effects on commerce.* Any NRHM routing designation made in accordance with this subpart shall not create an unreasonable burden upon interstate or intrastate commerce.

(xi) *Delays in transportation.* No NRHM routing designations may create unnecessary delays in the transportation of NRHM.

(xii) *Climatic conditions.* Weather conditions unique to a highway route such as snow, wind, ice, fog, or other climatic conditions that could affect the safety of a route, the dispersion of the NRHM upon release, or increase the difficulty of controlling it and cleaning it up shall be given appropriate consideration.

(xiii) *Congestion and accident history.* Traffic conditions unique to a highway routing such as: traffic congestion; accident experience with motor vehicles, traffic considerations that could affect the potential for an accident, exposure of the public to any release, ability to perform emergency response operations, or the temporary closing of a highway for cleaning up any release shall be given appropriate consideration.

[36 FR 4876, March 13, 1971, as amended at 72 FR 55703, Oct. 1, 2007]

397.73 Public information and reporting requirements.

(a) *Public information.* Information on NRHM routing designations must be made available by the State and Indian tribes to the public in the form of maps, lists, road signs or some combination thereof. If road signs are used, those signs and their placements must comply with the provisions of the Manual on Uniform Traffic Control Devices,[2] published by the FMCSA, particularly the Hazardous Cargo signs identified as R14-2 and R14-3 shown in Section 2B-43 of that Manual.

(b) *Reporting and publishing requirements.* Each State or Indian tribe, through its routing agency, shall provide information identifying all NRHM routing designations which exist within their jurisdictions on November 14, 1994 to the FMCSA, Office of Enforcement and Compliance (MC-EC), 1200 New Jersey Ave., SE., Washington, D.C. 20590-0001 by March 13, 1995. The State or Indian tribe shall include descriptions of these routing designations, along with the dates they were established. This

[2]This publication may be purchased from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, D.C. 20402 and has stock number 050-001-81001-8. It is available for inspection and copying as prescribed in 49 CFR Part 7, appendix D. See 23 CFR Part 655, subpart F.

information may also be published in each State's official register of State regulations. Information on any subsequent changes or new NRHM routing designations shall be furnished within 60 days after establishment to the FMCSA. This information will be available from the FMCSA, consolidated by the FMCSA, and published annually in whole or as updates in the FEDERAL REGISTER. Each State may also publish this information in its official register of State regulations.

(Approved by the Office of Management and Budget under control number 2125-0554).

[36 FR 4876, March 13, 1971, as amended at 72 FR 55703, Oct. 1, 2007]

397.75 Dispute resolution.

(a) *Petition.* One or more States or Indian tribes may petition the Administrator to resolve a dispute relating to an agreement on a proposed NRHM routing designation. In resolving a dispute under these provisions, the Administrator will provide the greatest level of safety possible without unreasonably burdening commerce, and ensure compliance with the Federal standards established at Part 397.71 of this subpart.

(b) *Filing.* Each petition for dispute resolution filed under this section must:

(1) Be submitted to the Administrator, Federal Motor Carrier Safety Administration, U.S. Department of Transportation, 1200 New Jersey Ave., SE., Washington, DC 20590-0001. Attention: Office of the Chief Counsel (MC-CC).

(2) Identify the State or Indian tribe filing the petition and any other State, political subdivision, or Indian tribe whose NRHM routing designation is the subject of the dispute.

(3) Contain a certification that the petitioner has complied with the notification requirements of paragraph (c) of this section, and include a list of the names and addresses of each State, political subdivision, or Indian tribe official who was notified of the filing of the petition.

(4) Clearly set forth the dispute for which resolution is sought, including a complete description of any disputed NRHM routing designation and an explanation of how the disputed routing designation affects the petitioner or how it impedes through highway routing. If the routing designation being disputed results in alternative routing, then a comparative risk analysis for the designated route and the resulting alternative routing shall be provided.

(5) Describe any actions taken by the State or Indian tribe to resolve the dispute.

(6) Explain the reasons why the petitioner believes that the Administrator should intervene in resolving the dispute.

(7) Describe any proposed actions that the Administrator should take to resolve the dispute and how these actions would provide the greatest level of highway safety without unreasonably burdening commerce and would ensure compliance with the Federal standards established in this subpart.

(c) *Notice.* (1) Any State or Indian tribe that files a petition for dispute resolution under this subpart shall mail a copy of the petition to any affected State, political subdivision, or Indian tribe, accompanied by a statement that the State, political subdivision, or Indian tribe may submit comments regarding the petition to the Administrator within 45 days. (2) By serving notice on any other State, political subdivision, or Indian tribe determined by the Administrator to be possibly affected by the issues in dispute or the resolution sought, or by publication in the FEDERAL REGISTER, the Administrator may afford those persons an opportunity to file written comments on the petition. (3) Any affected State, political subdivision, or Indian tribe submitting written comments to the Administrator with respect to a petition filed under this section shall send a copy of the comments to the petitioner and certify to the Administrator as to having complied with this requirement. The Administrator may notify other persons

participating in the proceeding of the comments and provide an opportunity for those other persons to respond.

(d) *Court actions.* After a petition for dispute resolution is filed in accordance with this section, no court action may be brought with respect to the subject matter of such dispute until a final decision has been issued by the Administrator or until the last day of the one-year period beginning on the day the Administrator receives the petition, whichever occurs first.

(e) *Hearings; alternative dispute resolution.* Upon receipt of a petition filed pursuant to paragraph (a) of this section, the Administrator may schedule a hearing to attempt to resolve the dispute and, if a hearing is scheduled, will notify all parties to the dispute of the date, time, and place of the hearing. During the hearing the parties may offer any information pertinent to the resolution of the dispute. If an agreement is reached, it may be stipulated by the parties, in writing, and, if the Administrator agrees, made part of the decision in paragraph (f) of this section. If no agreement is reached, the Administrator may take the matter under consideration and announce his or her decision in accordance with paragraph (f) of this section. Nothing in this section shall be construed as prohibiting the parties from settling the dispute or seeking other methods of alternative dispute resolution prior to the final decision by the Administrator.

(f) *Decision.* The Administrator will issue a decision based on the petition, the written comments submitted by the parties, the record of the hearing, and any other information in the record. The decision will include a written statement setting forth the relevant facts and the legal basis for the decision.

(g) *Record.* The Administrator will serve a copy of the decision upon the petitioner and any other party who participated in the proceedings. A copy of each decision will be placed on file in the public docket. The Administrator may publish the decision or notice of the decision in the FEDERAL REGISTER.

[36 FR 4876, March 13, 1971, as amended at 72 FR 55703, Oct. 1, 2007]

397.77 Judicial review of dispute decision.

Any State or Indian tribe adversely affected by the Administrator's decision under Part 397.75 of this subpart may seek review by the appropriate district court of the United States under such proceeding only by filing a petition with such court within 90 days after such decision becomes final.

SUBPART D - ROUTING OF CLASS 7 (RADIOACTIVE) MATERIALS

397.101 Requirements for motor carriers and drivers.

(a) Except as provided in paragraph (b) of this section or in circumstances when there is only one practicable highway route available, considering operating necessity and safety, a carrier or any person operating a motor vehicle that contains a Class 7 (radioactive) material, as defined in 49 CFR 172.403, for which placarding is required under 49 CFR Part 172 shall:

(1) Ensure that the motor vehicle is operated on routes that minimize radiological risk;

(2) Consider available information on accident rates, transit time, population density and activities, and the time of day and the day of week during which transportation will occur to determine the level of radiological risk, and

(3) Tell the driver which route to take and that the motor vehicle contains Class 7 (radioactive) materials.

(b) Except as otherwise permitted in this paragraph and in paragraph (f) of this section, a carrier or any person operating a motor vehicle containing a highway route controlled quantity of Class 7 (radioactive) materials, as defined in 49 CFR 173.403(l), shall operate the motor vehicle only over preferred routes.

(1) For purposes of this subpart, a preferred route is an Interstate System highway for which an alternative route is not designated by a State routing agency; a State-designated route selected by a State routing agency pursuant to Part 397.103; or both of the above.

(2) The motor carrier or the person operating a motor vehicle containing a highway route controlled quantity of Class 7 (radioactive) materials, as defined in 49 CFR 173.403(l) and (y), shall select routes to reduce time in transit over the preferred route segment of the trip. An Interstate System bypass or Interstate System beltway around a city, when available, shall be used in place of a preferred route through a city, unless a State routing agency has designated an alternative route.

(c) A motor vehicle may be operated over a route, other than a preferred route, only under the following conditions:

(1) The deviation from the preferred route is necessary to pick up or deliver a highway route controlled quantity of Class 7 (radioactive) materials, to make necessary rest, fuel or motor vehicle repair stops, or because emergency conditions make continued use of the preferred route unsafe or impossible;

(2) For pickup and delivery not over preferred routes, the route selected must be the shortest-distance route from the pickup location to the nearest preferred route entry location, and the shortest-distance route to the delivery location from the nearest preferred route exit location. Deviation from the shortest-distance pickup or delivery route is authorized if such deviation:

(i) Is based upon the criteria in paragraph (a) of this section to minimize the radiological risk; and

(ii) Does not exceed the shortest-distance pickup or delivery route by more than 25 miles and does not exceed 5 times the length of the shortest-distance pickup or delivery route.

(iii) Deviations from preferred routes, or pickup or delivery routes other than preferred routes, which are necessary for rest, fuel, or motor vehicle repair stops or because of emergency conditions, shall be made in accordance with the criteria in paragraph (a) of this section to minimize radiological risk, unless due to emergency conditions, times does not permit use of those criteria.

(d) A carrier (or a designated agent) who operates a motor vehicle which contains a package of highway route controlled quantity of Class 7 (radioactive) materials, as defined in 49 CFR 173.403(l), shall prepare a written route plan and supply a copy before departure to the motor vehicle driver and a copy to the shipper (before departure for exclusive use shipments, as defined in 49 CFR 173.403(i), or within fifteen working days following departure for all other shipments). Any variation between the route plan and routes actually used, and the reason for it, shall be reported in an amendment to the route plan delivered to the shipper as soon as practicable but within 30 days following the deviation. The route plan shall contain:

(1) A statement of the origin and destination points, a route selected in compliance with this section, all planned stops, and estimated departure and arrival times; and

(2) Telephone numbers which will access emergency assistance in each State to be entered.

(e) No person may transport a package of highway route controlled quantity of Class 7 (radioactive) materials on a public highway unless:

(1) The driver has received within the two preceding years, written training on:

(i) Requirements in 49 CFR Parts 172, 173 and 177 pertaining to the Class 7 (radioactive) materials transported; and

(ii) The properties and hazards of the Class 7 (radioactive) materials being transported; and

(iii) Procedures to be followed in case of an accident or other emergency.

(2) The driver has in his or her immediate possession a certificate of training as evidence of training required by this section, and a copy is placed in his or her qualification file (see Part 391.51 of this subchapter), showing:

(i) The driver's name and operator's license number;

(ii) The dates training was provided;

(iii) The name and address of the person providing the training;

(iv) That the driver has been trained in the hazards and characteristics of highway route controlled quantity of Class 7 (radioactive) materials; and

(v) A statement by the person providing the training that information on the certificate is accurate.

(3) The driver has in his or her immediate possession the route plan required by paragraph (d) of this section and operates the motor vehicle in accordance with the route plan.

(f) A person may transport irradiated reactor fuel only in compliance with a plan if required under 49 CFR 173.22(c) that will ensure the physical security of the material. Variation for security purposes from the requirements of this section is permitted so far as necessary to meet the requirements imposed under such a plan, or otherwise imposed by the U. S. Nuclear Regulatory Commission in 10 CFR Part 73.

(g) Except for packages shipped in compliance with the physical security requirements of the U. S. Nuclear Regulatory Commission in 10 CFR Part 73, each carrier who accepts for transportation a highway route controlled quantity of Class 7 (radioactive) material (see 49 CFR 173.401(l)), must, within 90 days following the acceptance of the package, file the following information concerning the transportation of each such package with the Office of Enforcement and Compliance (MC-EC), Federal Motor Carrier Safety Administration, 1200 New Jersey Ave., SE., Washington, DC 20590-0001;

(1) The route plan required under paragraph (d) of this section, including all required amendments reflecting the routes actually used;

(2) A statement identifying the names and addresses of the shipper, carrier and consignee; and

(3) A copy of the shipping paper or the description of the Class 7 (radioactive) material in the shipment required by 49 CFR 172.202 and 173.203.

[57 FR 44131, Sep 24, 1992, as amended at 66 FR 49874, Oct 1, 2001; 72 FR 55703, Oct 1, 2007]

397.103 Requirements for State routing designations.

(a) The State routing agency, as defined in Part 397.201(c), shall select routes to minimize radiological risk using "Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials," or an equivalent routing analysis which adequately considers overall risk to the public. Designations must be preceded by substantive consultation with affected local jurisdictions and with any other affected States to ensure consideration of all impacts and continuity of designated routes.

(b) State routing agencies may designate preferred routes as an alternative to, or in addition to, one or more Interstate System highways, including interstate system bypasses, or Interstate System beltways.

(c) A State-designated route is effective when-

(1) The State gives written notice by certified mail, return receipt requested, to the Federal Motor Carrier Safety Administration, Office of Enforcement and Compliance (MC-EC), Attn: National Hazardous Materials Route Registry, 1200 New Jersey Ave., SE., Washington, DC 20590-0001.

(2) Receipt thereof is acknowledged in writing by the FMCSA.

(d) A list of State-designated preferred routes and a copy of the "Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials," are available upon request to Office of Enforcement and Compliance (MC-EC), 1200 New Jersey Ave., SE., Washington, DC 20590-0001.

[57 FR 44131, Sept. 24, 1992, as amended at 66 FR 49874, Oct 1, 2001; 72 FR 55703, Oct 1, 2007]

SUBPART E - PREEMPTION PROCEDURES

Source: 57 FR 44132, Sept. 24, 1992, unless otherwise noted.

397.201 Purpose and scope of the procedures.

(a) This subpart prescribes procedures by which:

(1) Any person, including a State, political subdivision thereof, or Indian tribe, directly affected by any highway routing designation for hazardous materials may apply to the Administrator for a determination as to whether that highway routing designation is preempted under 49 U.S.C. 5125, or Part. 397.69 or Part. 397.203; and

(2) A State, political subdivision thereof, or Indian tribe may apply to the Administrator for a waiver of preemption with respect to any highway routing designation that the State, political subdivision thereof, or Indian tribe acknowledges to be preempted by 49 U.S.C. 5125, or Part. 397.69 or Part. 397.203, or that has been determined by a court of competent jurisdiction to be so preempted.

(b) Unless otherwise ordered by the Administrator, an application for a preemption determination which includes an application for a waiver of preemption will be treated and processed solely as an application for a preemption determination.

(c) For purposes of this part:

Act means 49 U.S.C. 5101 *et seq.,* formerly known as the Hazardous Materials Transportation Act.

Administrator means the Federal Highway Administrator, who is the chief executive of the Federal Motor Carrier Safety Administration, an agency of the United States Department of Transportation, or his/her designate.

Hazardous material means a substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, or property, when transported in commerce, and which has been so designated.

Indian tribe has the same meaning as contained in section 4 of the Indian Self-Determination and Education Act, 25 U.S.C. 450b.

Person means an individual, firm, co-partnership, corporation, company, association, joint-stock association, including any trustee, receiver, assignee, or similar representative thereof, or government, Indian tribe, or agency or instrumentality of any government or Indian tribe when it offers hazardous materials for transportation in commerce or transports hazardous materials in furtherance of a commercial enterprise, but such term does not include the United States Postal Service.

Political subdivision includes a municipality; a public agency or other instrumentality of one or more States, or a public corporation, board, or commission established under the laws of one or more States.

Routing agency means the State highway agency or other State agency designated by the Governor of the State, or an agency designated by an Indian tribe, to supervise, coordinate, and approve the highway routing designations for that State or Indian tribe. Any highway routing designation made by a political subdivision of a State shall be considered a designation made by that State.

Routing designation includes any regulation, limitation, restriction, curfew, time of travel restriction, lane restriction, routing ban, port-of-entry designation, or route weight restriction applicable to the highway transportation of hazardous materials over a specific highway route or portion of a route.

State means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Virgin Islands, American Samoa, Guam, or any other territory or possession of the United States designated by the Secretary.

[57 FR 44132, Sept. 24, 1992, as amended at 59 FR 51834, Oct. 12, 1994]

397.203 Standards for determining preemption.

(a) Any highway routing designation established, maintained, or enforced by a State, political subdivision thereof, or Indian tribe is preempted if-

(1) Compliance with both the highway routing designation and any requirement under the Act or of a regulation issued under the Act is not possible;

(2) The highway routing designation as applied or enforced creates an obstacle to the accomplishment and execution of the Act or the regulations issued under the Act; or

(3) The highway routing designation is preempted pursuant to Part 397.69(b).

(b) [Reserved].

(57 FR 44132, Sept. 24, 1992, as amended at 59 FR 51834, Oct. 12, 1994]

397.205 Preemption application.

(a) Any person, including a State, political subdivision thereof, or Indian tribe directly affected by any highway routing designation of another State, political subdivision, or Indian tribe, may apply to the Administrator for a determination of whether that highway routing designation is preempted by the Act or Part 397.203 of this subpart. The Administrator shall publish notice of the application in the FEDERAL REGISTER.

(b) Each application filed under this section for a determination must:

(1) Be submitted to the Administrator, Federal Motor Carrier Safety Administration, 1200 New Jersey Ave., SE., Washington, D.C. 20590-0001. Attention: Office of the Chief Counsel, Enforcement and Litigation Division (MC-CCE), Hazardous Materials Preemption;

(2) Set forth a detailed description of the highway routing designation of the State, political subdivision thereof, or Indian tribe for which the determination is sought;

(3) If applicable, specify the provisions of the Act or the regulations issued under the Act under which the applicant seeks preemption of the highway routing designation of the State, political subdivision thereof, or Indian tribe;

(4) Explain why the applicant believes the highway routing designation of the State, political subdivision thereof, or Indian tribe should or should not be preempted under the standards of Part 397.203; and

(5) State how the applicant is affected by the highway routing designation of the State, political subdivision thereof, or Indian tribe.

(c) The filing of an application for a determination under this section does not constitute grounds for noncompliance with any requirement of the Act or any regulation issued under the Act.

(d) Once the Administrator has published notice in the FEDERAL REGISTER of an application received under paragraph (a) of this section, no applicant for such determination may seek relief with respect to the same or substantially the same issue in any court until final action has been taken on the application or until 180 days after filing of the application, whichever occurs first. Nothing in this section shall be construed as prohibiting any person, including a State, political subdivision thereof, or Indian tribe, directly affected by any highway routing designation from seeking a determination of preemption in any court of competent jurisdiction in lieu of applying to the Administrator under paragraph (a) of this section.

[57 FR 44132, Sept. 24, 1992, as amended at 72 FR 55703, Oct 1, 2007]

397.207 Preemption notice.

(a) If the applicant is other than a State, political subdivision thereof, or Indian tribe, the applicant shall mail a copy of the application to the State, political subdivision thereof, or Indian tribe concerned, accompanied by a statement that comments may be submitted regarding the application to the Administrator within 45 days. The application filed with the Administrator must include a certification that the applicant has complied with this paragraph and must include the names and addresses of each official to whom a copy of the application was sent.

(b) The Administrator may afford interested persons an opportunity to file written comments on the application by serving notice on any persons readily identifiable by the Administrator as persons who will be affected by the ruling sought or by the publication in the FEDERAL REGISTER.

(c) Each person submitting written comments to the Administrator with respect to an application filed under this section shall send a copy of the comments to the applicant and certify to the Administrator that he or she has complied with this requirement. The Administrator may notify other persons participating in the proceeding of the comments and provide an opportunity for those other persons to respond.

397.209 Preemption processing.

(a) The Administrator may initiate an investigation of any statement in an application and utilize in his or her evaluation any relevant facts obtained by that investigation. The Administrator may solicit and accept submissions from third persons relevant to an application and will provide the applicant an opportunity to respond to all third person submissions. In evaluating an application, the Administrator

may consider any other source of information. The Administrator may convene a hearing or conference, if a hearing or conference will advance the evaluation of the application.

(b) The Administrator may dismiss the application without prejudice if;

(1) he or she determines that there is insufficient information upon which to base a determination; or

(2) he or she requests additional information from the applicant and it is not submitted.

397.211 Preemption determination.

(a) Upon consideration of the application and other relevant information received, the Administrator issues a determination.

(b) Notwithstanding that an application for a determination has not been filed under Part 397.205, the Administrator, on his or her own initiative, may issue a determination as to whether a particular highway routing designation of a State, political subdivision thereof, or Indian tribe is preempted under the Act or the regulations issued under the Act.

(c) The determination includes a written statement setting forth the relevant facts and the legal basis for the determination, and provides that any person aggrieved thereby may file a petition for reconsideration within 20 days in accordance with Part 397.223.

(d) Unless the determination is issued pursuant to paragraph (b) of this section, the Administrator serves a copy of the determination upon the applicant. In all preemption determinations, the Administrator serves a copy of the determination upon any other person who participated in the proceeding or who is readily identifiable by the Administrator as affected by the determination. A copy of each determination is placed on file in the public docket. The Administrator may publish the determination or notice of the determination in the FEDERAL REGISTER.

(e) If no petition for reconsideration is filed within 20 days in accordance with Part 397.223, a determination issued under this section constitutes the final agency decision as to whether a particular highway routing designation of a State, political subdivision thereof, or Indian tribe is preempted under the Act or regulations issued thereunder. The fact that a determination has not been issued under this section with respect to a particular highway routing designation of a State, political subdivision thereof, or Indian tribe carries no implication as to whether the requirement is preempted under the Act or regulations issued thereunder.

397.213 Waiver of preemption application.

(a) Any State, political subdivision thereof, or Indian tribe may apply to the Administrator for a waiver of preemption with respect to any highway routing designation that the State, political subdivision thereof, or Indian tribe acknowledges to be preempted by the Act, Part 397.203 of this subpart, or a court of competent jurisdiction. The Administrator may waive preemption with respect to such requirement upon a determination that such requirement-

(1) Affords an equal or greater level of protection to the public than is afforded by the requirements of the Act or regulations issued under the Act, and

(2) Does not unreasonably burden commerce.

(b) Each application filed under this section for a waiver of preemption determination must:

(1) Be submitted to the Administrator, Federal Motor Carrier Safety Administration, 1200 New Jersey Ave., SE., Washington, D.C. 20590-0001. Attention: Office of the Chief Counsel, Enforcement and Litigation Division (MC-CCE), Hazardous Materials Preemption Docket;

(2) Set forth a detailed description of the highway routing designation of the State, political subdivision thereof, or Indian tribe for which the determination is being sought;

(3) Include a copy of any relevant court order or determination issued pursuant to Part 397.211;

(4) Contain an express acknowledgement by the applicant that the highway routing designation of the State, political subdivision thereof, or Indian tribe is preempted under the Act or the regulations issued under the Act, unless it has been so determined by a court of competent jurisdiction or in a determination issued under this subpart;

(5) Specify each provision of the Act or the regulations issued under the Act that preempts the highway routing designation of the State, political subdivision thereof, or Indian tribe;

(6) State why the applicant believes that the highway routing designation of the State, political subdivision thereof, or Indian tribe affords an equal or greater level of protection to the public than is afforded by the requirements of the Act or the regulations issued under the Act;

(7) State why the applicant believes that the highway routing designation of the State, political subdivision thereof, or Indian tribe does not unreasonably burden commerce; and

(8) Specify what steps the State, political subdivision thereof, or Indian tribe is taking to administer and enforce effectively the preempted requirement.

[57 FR 44132, Sept. 24, 1992, as amended at 72 FR 55703, Oct 1, 2007]

397.215 Waiver notice.

(a) The applicant State, political subdivision thereof, or Indian tribe shall mail a copy of the application and any subsequent amendments or other documents relating to the application to each person whom the applicant reasonably ascertains will be affected by the determination sought. The copy of the application must be accompanied by a statement that the person may submit comments regarding the application to the Administrator within 45 days. The application filed with the Administrator must include a certification that the application has complied with this paragraph and must include the names and addresses of each person to whom the application was sent.

(b) Notwithstanding the provisions of paragraph (a) of this section, if the State, political subdivision thereof, or Indian tribe determines that compliance with paragraph (a) of this section would be impracticable, the applicant shall:

(1) Comply with the requirements of paragraph (a) of this section with regard to those persons whom it is reasonable and practicable to notify; and

(2) Include with the application filed with the Administrator a description of the persons or class or classes of persons to whom notice was not sent.

(c) The Administrator may require the applicant to provide notice in addition to that required by paragraphs (a) and (b) of this section, or may determine that the notice required by paragraph (a) of this section is not impracticable, or that notice should be published in the FEDERAL REGISTER.

(d) The Administrator may serve notice on any other persons readily identifiable by the Administrator as persons who will be affected by the determination sought and may afford those persons an opportunity to file written comments on the application.

(e) Any person submitting written comments to the Administrator with respect to an application filed under this section shall send a copy of the comments to the applicant. The person shall certify to the Administrator that he or she has complied with the requirements of this paragraph. The

Administrator may notify other persons participating in the proceeding of the comments and provide an opportunity for those other persons to respond.

397.217 Waiver processing.

(a) The Administrator may initiate an investigation of any statement in an application and utilize any relevant facts obtained by that investigation. The Administrator may solicit and accept submissions from third persons relevant to an application and will provide the applicant an opportunity to respond to all third person submissions. In evaluating an application, the Administrator may convene a hearing or conference, if a hearing or conference will advance the evaluation of the application.

(b) The Administrator may dismiss the application without prejudice if:

(1) He or she determines that there is insufficient information upon which to base a determination;

(2) Upon his or her request, additional information is not submitted by the applicant; or

(3) The applicant fails to provide the notice requires by this subpart.

(c) Except as provided in this subpart, the Administrator will only consider an application for a waiver of preemption determination if:

(1) The applicant expressly acknowledges in its application that the highway routing designation of the State, political subdivision thereof, or Indian tribe for which the determination is sought is preempted by the Act or the regulations thereunder; or

(2) The highway routing designation of the State, political subdivision thereof, or Indian tribe has been determined by a court of competent jurisdiction or in a determination issued pursuant to Part 397.211 to be preempted by the Act or the regulations issued thereunder.

(d) When the Administrator has received all substantive information necessary to process an application for a waiver of preemption determination, notice of that fact will be served upon the applicant. Additional notice to all other persons who received notice of the proceeding may be served by publishing a notice in the FEDERAL REGISTER.

397.219 Waiver determination and order.

(a) Upon consideration of the application and other relevant information received or obtained during the proceeding, the Administrator issues an order setting forth his or her determination.

(b) The Administrator may issue a waiver of preemption order only if he or she finds that the requirement of the State, political subdivision thereof, or Indian tribe affords the public a level of safety at least equal to that afforded by the requirements of the Act and the regulations issued under the Act and does not unreasonably burden commerce. In determining whether the requirement of the State, political subdivision thereof, or Indian tribe unreasonably burdens commerce, the Administrator may consider the following factors:

(1) The extent to which increased costs and impairment of efficiency result from the highway routing designation of the State, political subdivision thereof, or Indian tribe;

(2) Whether the highway routing designation of the State, political subdivision thereof, or Indian tribe has a rational basis;

(3) Whether the highway routing designation of the State, political subdivision thereof, or Indian tribe achieves its stated purpose; and

(4) Whether there is need for uniformity with regard to the subject concerned and if so, whether the highway routing designation of the State, political subdivision thereof, or Indian tribe competes or conflicts with those of other States, political subdivisions thereof, or Indian tribes.

(c) The order includes a written statement setting forth the relevant facts and the legal basis for the determination, and provides that any person aggrieved by the order may file a petition for reconsideration in accordance with Part 397.223.

(d) The Administrator serves a copy of the order upon the applicant, any other person who participated in the proceeding and upon any other person readily identifiable by the Administrator as one who may be affected by the order. A copy of each order is placed on file in the public docket. The Administrator may publish the order or notice of the order in the FEDERAL REGISTER.

(e) If no petition for reconsideration is filed within 20 days in accordance with Part 397.223, an order issued under this section constitutes the final agency decision regarding whether a particular requirement of a State, political subdivision thereof, or Indian tribe is preempted under the Act or any regulations issued thereunder, or whether preemption is waived.

397.221 Timeliness.

If the Administrator fails to take action on the application within 90 days of serving the notice required by Part 397.217(d), the applicant may treat the application as having been denied in all respects.

397.223 Petition for reconsideration.

(a) Any person aggrieved by an order issued under Part 397.211 or Part 397.219 may file a petition for reconsideration with the Administrator. The petition must be filed within 20 days of service of the determination or order issued under the above sections.

(b) The petition must contain a concise statement of the basis for seeking reconsideration, including any specific factual or legal errors, or material information not previously available.

(c) The petitioner shall mail a copy of the petition to each person who participated, either as an applicant or routing, in the waiver of preemption proceeding, accompanied by a statement that the person may submit comments concerning the petition to the Administrator within 20 days. The petition filed with the Administrator must contain a certification that the petitioner has complied with this paragraph and include the names and addresses of all persons to whom a copy of the petition was sent.

(d) The Administrator's decision under this section constitutes the final agency decision. If no petition for reconsideration is filed under this section, then the determination issued under Part 397.211 or 397.219 becomes the final agency decision at the end of the 20 day period.

397.225 Judicial review.

A party to a proceeding under Part 397.205(a), 397.213(a), or 397.223(a) may seek review by the appropriate district court of the United States of the decision of the Administrator under such proceeding only by filing a petition with such court within 60 days after the final agency decision.

ATTACHMENT C
PROCESS INFORMATION

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C.1 MTR Operations C-1

ATTACHMENT C
Process Information

Explosive ordnance stockpiles maintained at MCAS Yuma and other military bases are subject to inventory turnover. Items may become obsolete (weapons systems changes), outdated (shelf- life expiration), or unserviceable (e.g., damaged, dropped items). When relegated to these categories, treatment is necessary to render the munitions inert for disposal. Munitions treatment may also be required when aircraft crash or make emergency landings. Finally, disposal of explosive devices may be required under agreements with local governments or international agreements.

Munitions treatment occurs at the MTR. The annual amount of destroyed munitions varies widely year to year. From 1989 to 1999, the total weight of destroyed ranged from 1,000 pounds NEW to approximately 60,000 pounds NEW (Note: NEW is approximately one-third of the total weight, though it varies by specific munition). On average, between 1989 to 1999 about 18,000 pounds NEW were treated at the MTR annually. Disposal information is unavailable between 2000 and 2003. From 2004 to 2014, the total weight of destroyed munitions ranged from 2 pounds NEW to 6,500 pounds NEW. However, due to closures of other MTRs in the region, this volume is anticipated to increase by four times to 72,000 pounds NEW annually. In preparation of this expected increase, MCAS Yuma has begun expansion of the ammunition supply point to increase MCAS Yuma's storage capacity. The information provided in the following subsections is presented in accordance with the requirements of 40 CFR 270.23 and 40 CFR 264 Subpart X.

C.1 MTR Operations

This section describes the MTR operations. Additional details can be found in the EOD SOP (Attachment A, Exhibit A-1) and in the current version of NAVSEA OP-5 (Attachment B, Exhibit B-6).

Fragment, non-fragment, and white phosphorous OD is conducted on the MTR. All explosives greater than caliber .50 are detonated. OD operations at the MTR are not conducted on a set schedule; rather, treatment operations are conducted on an as-needed basis. Operations are not conducted in wet weather, when winds exceed 15 mph, in thunderstorms or electric storms. The maximum amount of waste military munitions authorized per detonation is 1,000 pounds NEW, but may not exceed 5,563 ft ESQD Arc for robust munitions per the current version of NAVSEA OP-5 Table 13-2 (Attachment B, Exhibit B-6).

Munitions to be treated, including those received from offsite sources may be held at the MCAS Yuma ASP in the designated EOD magazine 2310 for a period not to exceed ten days. The facility consists of bunkers on the south end of Main Base. At the ASP, waste items are inspected, verified against shipping papers (or if from an in-house source, logged on an inventory form as to the type, the NEW, quantities of each item and net cubic feet of displacement), and consolidated, as needed. The waste inventory is manifested to the MTR. Prior to mobilization to the MTR, MCAS Yuma

EOD prepares a detailed Hazardous Waste Treatment Operations Order identifying staff and responsibilities for the mission. Each team member reads and signs the document prior to executing the mission.

The munitions are loaded onto vehicles for transport to the MTR. Seven-ton tactical trucks may also be used for transport. All transport operations are performed on the day the treatment is to occur. The number of vehicles used depends on the type and amount of items being transported. Transportation of these items is governed by 49 CFR 172 Subparts B through I, applicable parts of 40 CFR 263, and the Navy's Shipping Inspector's Manual for Ammunition, Explosives and Related Hazardous Materials (Attachment B, Exhibit B-6). Placards on the vehicles designate the type of explosive being transported (i.e., Division 1.1, 1.2, 1.3, or 1.4 explosives). Upon arrival at the MTR, red flags are displayed on the north and south flagpoles (one mile from the MTR) to indicate that the range is active and treatment operations are in progress. The waste items are transported to and unloaded at the designated area for detonation.

Military explosive ordnance and government-contract explosive ordnance devices are fitted with a time-delayed donor explosive charge and detonated on the ground or in small pits created as a result of previous detonations. Open detonation units are created by the detonation of unexploded ordnance. The detonation of a bomb creates the original pit and subsequent bomb detonation increases the pit size and depth. The detonation units are inspected weekly, after each detonation, and after storm events or high winds. The units are inspected for integrity, depth, and kickout. If an inspection indicates a detonation pit is unusable, it is abandoned and not repaired. When the pit becomes too deep (i.e., unsafe to roll a bomb into, 10 feet or deeper) MCAS Yuma EOD will mark the pit with surveyors' tape and the Environmental Department will be notified in writing. The Environmental Department will sample the pit and will request an escort from EOD for backfilling the pit with native soil. After backfilling, a new detonation pit is developed in the same place as a result of the next OD event.

All treated munitions are examined for treatment effectiveness. Second or subsequent detonations are performed until the operation is successful. Metal casings and kickouts are inspected and collected for recycling as scrap metal. Historically, all kickouts were removed from the floodplain (portion of the MTR that was west of the road) after final OD of each operating day. As of 2024, Federal Emergency Management Agency (FEMA) has determined that there is a 0.2 percent flood rating throughout the entire MTR and that there is no elevated flood risk on the MTR. There should be no flood plain restrictions on the site.

All operations are monitored from both north and south range flag areas located approximately one mile from the MTR. Two safety bunkers intended for emergency use only are located in the detonation area and are constructed of reinforced concrete. The concrete shelters are located on the MTR with the shelter entrances opposite of the staged detonations.

ATTACHMENT D
SOIL AND GROUNDWATER MONITORING

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Exhibit D-5 Regional Groundwater Elevation Map

Exhibit D-6 Well Construction Diagram

Exhibit D-1

Groundwater Monitoring Plan

DRAFT

Sampling and Analysis Plan

Groundwater Monitoring
Munitions Treatment Range
Marine Corps Air Station
Yuma, Arizona

January 2025

Prepared for:

United States Department of the Navy
Naval Facilities Engineering Systems Command Southwest
750 Pacific Highway
San Diego, CA 92132

Prepared by:

Liberty JV
1851 W. 24th Street
Yuma, AZ 85364-6104

Prepared under:

Contract N44255-20-D-5006, Task Order No. N6247322F4675

Plan Prepared By:	Eric Gardner, Liberty JV PM	2/28/25 Date
Plan Approved By:	Jesse MacNeill, Liberty JV QA Coordinator	2/28/25 Date
Plan Approved By:	Mark Galate, MCAS Yuma	2/27/2025 Date

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Acronyms and Abbreviations

˚C ..... degrees Celsius
µg/L ..... micrograms per liter
mg/L ..... milligrams per liter
mL/min ..... milliliters per minute

ADEQ ..... Arizona Department of Environmental Quality
AWQS ..... aquifer water quality standards

bgs ..... below ground surface
BMGR ..... Barry M. Goldwater Range

COC ..... chain of custody
CPR ..... cardiopulmonary resuscitation

DO ..... dissolved oxygen
DOD ..... United States Department of Defense
DON ..... United States Department of the Navy
DQO ..... data quality objective
DRO ..... diesel range organic

EB ..... equipment blank
EC ..... electrical conductivity
ELAP ..... Environmental Laboratory Accreditation Program

FB ..... field blank
FTL ..... field team leader

GRO ..... gas range organic

HAZWOPER ..... Hazardous Waste Operations and Emergency Response
H & S ..... Health & Safety

IDW ..... investigation-derived waste

JV ..... Joint Venture

MCL ..... maximum contaminant level
MCAS ..... Marine Corps Air Station
MS ..... matrix spike
MSD ..... matrix spike duplicate
MTR ..... Munitions Treatment Range

NAVFAC ..... Naval Facilities Engineering Systems Command

NAVFAC SW ..... Naval Facilities Engineering Systems Command Southwest

ORO ..... oil range organic
ORP ..... oxidation-reduction potential
OSHA ..... Occupational Safety and Health Administration

PM ..... Project Manager

QA ..... quality assurance
QC ..... quality control
QSM ..... quality systems manual

RCRA ..... Resource Conservation and Recovery Act

SAP ..... Sampling and Analysis Plan
SOP ..... standard operating procedure
SOW ..... scope of work
SSHO ..... Site Safety & Health Officer
SSHP ..... Site Health and Safety Plan
SVOC ..... semivolatile organic compound

TB ..... trip blank
TO ..... task order
TPH ..... total petroleum hydrocarbon

UFP ..... Uniform Federal Policy
UFP-QAPP ..... Uniform Federal Policy for Quality Assurance Project Plans
USEPA ..... United States Environmental Protection Agency

VOC ..... volatile organic compound

Executive Summary

This Sampling and Analysis Plan (SAP) describes the rationale, scope of work (SOW), procedures, and methodologies to be employed during the collection and analysis of groundwater samples during annual groundwater sampling from one groundwater monitoring well located at the Munitions Treatment Range (MTR) at Marine Corps Air Station (MCAS) Yuma. The MTR is illustrated in Figure 1 and Figure 2.

The overall quality of tasks performed for this project will be assured by conformance to protocols established for sample collection, analytical procedures, and data management. The purpose of this SAP is to present a sampling strategy, including a field sampling methodology and the quality assurance/quality control (QA/QC) protocols that will be implemented throughout the project. The objective of the sampling event is to characterize the environmental conditions present at the MTR through the collection of groundwater samples.

All samples will be analyzed at an Environmental Laboratory Accreditation Program (ELAP)-certified fixed-base laboratory for the following:

- Explosives, EPA Method 8330;
- Nitrate/Nitrite, EPA Method 353.3;
- Perchlorate, EPA Method 6850;
- White Phosphorus, EPA Method 7580;
- Ammonia, EPA Method 350.2;
- Total petroleum hydrocarbons (TPH) Gasoline Range Organics (GRO), EPA Method 5030B/8015B;
- TPH Diesel Range Organics / Oil Range Organics (DRO/ORO), EPA Method 3550B/8015AZ Modified;
- Metals, EPA Methods 6010B and 7470;
- Semi-volatile organic compounds (SVOCs), EPA Method 8270; and
- Volatile organic compounds (VOCs), EPA Method 8260.

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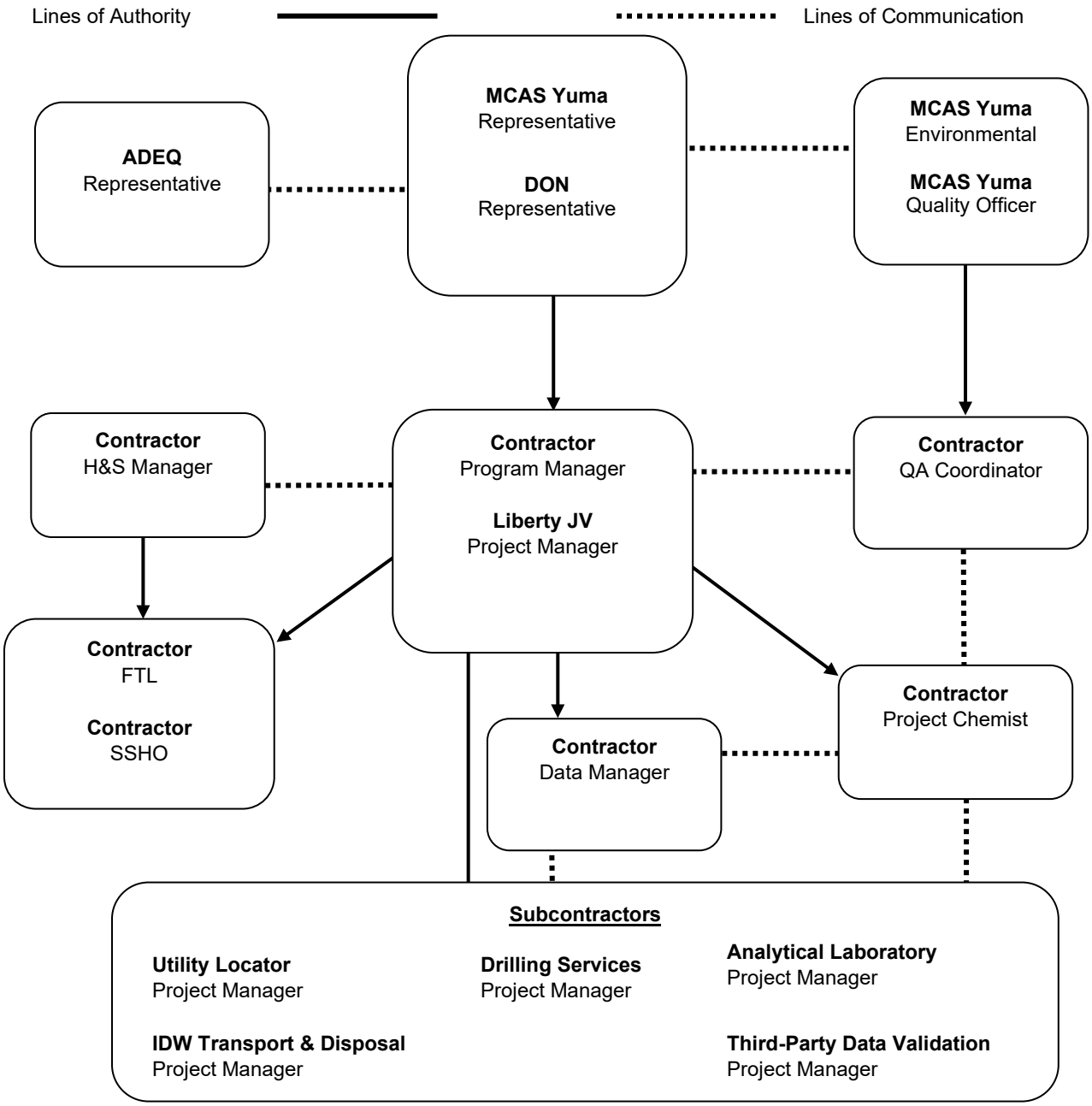
1.0 Responsibilities and Lines of Authority

Project Organizational Chart



ADEQ = Arizona Department of Environmental Quality; DON = Department of the Navy; FTL = Field Team Leader; H&S = Health and Safety; IDW = investigation-derived waste; JV = Joint Venture; MCAS = Marine Corps Air Station; QC = quality control; SSHO = Site Safety & Health Officer

1.1 Project Stakeholders

- MCAS Yuma – Lead Agency/Permit Holder
- Department of the Navy (DON) – Contract Execution and Management
- Arizona Department of Environmental Quality (ADEQ) - Lead Regulatory Agency

1.2 Project Manager (PM)

The PM is the primary point of contact for the project team and stakeholders. They are responsible for comprehensive oversight and final decision-making for the project. The PM coordinates work activities and subcontractor personnel, ensuring that field activities are performed in accordance with the SAP. They promote a safe work environment for all project personnel by applying work guidelines specified in the Site Health and Safety Plan (SSHP) and all applicable Occupational Safety and Health Administration (OSHA) regulations. Additionally, the PM serves as a technical resource to the project team and stakeholders.

1.3 Field Team Leader (FTL)

The FTL directs site activities following the approved SAP and Federal, state, and applicable local laws and regulations. The FTL provides direction to the field staff and subcontractors and has the responsibility and authority to halt or modify any working conditions and remove any person who refuses to comply with the site plans or whose behavior endangers their safety or the safety of others. The FTL may also have collateral duties, such as the SSHO.

1.4 Quality Assurance Coordinator

The Quality Assurance Coordinator ensures the project-specific SAP conforms to current NAVFAC requirements. They review and approve the SAP, communicate with the PM, and notify them of any deviations from the SAP and nonconformance issues. Additionally, they coordinate field and laboratory QA, oversee field QA and project QA compliance, and hold the authority to suspend project activities if QA requirements are not met.

1.5 Site Safety and Health Officer (SSHO)

The SSHO will provide day-to-day support, conduct tailgate safety meetings, verify training and medical clearances of on-site personnel, and report activities to the PM. The SSHO is the primary contact in any on-site emergency. The SSHO is responsible for facilitating and coordinating the field implementation of the SSHP and has the responsibility and authority to halt or modify hazardous activities or working conditions.

2.0 Project Technical Design

2.1 Project Description / Background

Marine Corps Air Station (MCAS) Yuma is located in the City of Yuma in the southwestern corner of Arizona. The Barry M. Goldwater Range (BMGR), a 2.8-million-acre area, is divided into two segments; the eastern two-thirds is designated the Gila Bend segment (approximately 1.6 million acres), and the western third is designated the Yuma segment. The Yuma segment occupies approximately 760,000 acres and is operated by MCAS Yuma. MCAS Yuma operates four sub-ranges in the BMGR: two manned ranges, an air-to-air gunnery range, and an air combat maneuvering range. These sub-ranges have been important MCAS Yuma facilities for training pilots in aerial and air-to-ground combat since 1941.

The MTR, a 1000-meter square area located on the far western boundary of the Yuma segment of the BMGR, is regulated under RCRA. The MTR facility is used to treat ordnance stockpiled at MCAS Yuma as well as ordnance and explosive end items from other military bases and bombing ranges, from local government-owned manufacturing facilities, and local manufacturers under contract to the United States government located in Arizona and California.

The MTR was formerly used for open burning and open detonation. The two former open burn trenches were clean-closed in accordance with federal and State of Arizona regulations and requirements in October 1998. The MTR is used for open detonation activities, including fragment, non-fragment, and white phosphorus. There are currently two main detonation areas: the Class A and B Detonation Area and the White Phosphorus Detonation Area. Both detonation areas are in the central portion of the MTR.

2.2 Data Quality Objectives (DQOs)

The investigation aims to evaluate the potential for groundwater contamination due to ongoing activities at the MTR. The goal is to collect groundwater data annually to characterize the groundwater at the MTR.

The Decision Rules for this investigation are based on comparing laboratory analytical results to maximum contaminant levels (MCLs) and aquifer water quality standards (AWQS) established by ADEQ (Section 10.0).

The principal Decision Rules for this sampling are:

a) **If** the concentrations of hazardous substances in the annual groundwater sampling exceed the AWQS or MCL values, **then** a work plan for further investigation and/or remediation will be developed and submitted to ADEQ.

b) **If** the concentrations of hazardous substances in the annual groundwater sampling do not exceed the AWQS or MCL values, **then** no further action will be necessary.

2.3 Sampling Points

One (1) primary groundwater sample will be collected annually (Figure 2).

2.4 Sampling Method

Groundwater samples will be collected from the monitoring well using the USEPA low-stress (low-flow) procedures (USEPA, 2017). Groundwater sampling will be performed in accordance with *Low-Flow Sampling* standard operating procedure (SOP) 09 (Attachment 1). Groundwater sampling is further detailed in Section 9.1.2.

2.5 Analytical Methods

Groundwater samples collected from the MTR will be analyzed for:

- Explosives by EPA Method 8330,
- Nitrate/Nitrite by EPA Method 353.3,
- Perchlorate by EPA Method 6850,
- White Phosphorus by EPA Method 7580,
- Ammonia by EPA Method 1690,
- TPH-Gasoline Range Organics (GRO) by EPA Methods 5030B/8015B,
- TPH-Diesel Range Organics (DRO)/Oil Range Organics (ORO) by EPA Methods 3550B/8015AZ,
- Metals by EPA Methods 6020B/7470A,
- SVOCs by EPA Method 8270, and
- VOCs by EPA Method 8260D

All samples will be sent to a laboratory certified by the United States Department of Defense (DoD) ELAP and the State of Arizona. Analyses will comply with the DoD Quality Systems Manual (QSM) Version 5.4 (DoD, 2021).

2.6 Quality Control Activities

QC samples will be collected at a frequency designated in Section 4.0. QC samples will include field duplicates, matrix spikes (MS) and matrix spike duplicates (MSD), equipment blanks (EB), and field blanks (FB). If reusable sampling equipment is used, an EB will be collected from decontaminated sampling equipment. Analytical methods will include performing initial calibrations, continuing calibration, tuning, laboratory blanks, replicates, laboratory control spikes, and other applicable QC as defined by DoD QSM Version 5.4 (DoD, 2021).

Field blanks will be collected using the same deionized water source used to decontaminate the sampling equipment in the field. The field blank will be shipped to the laboratory and analyzed with the remaining samples.

Samples will be collected, managed, and shipped to the selected laboratory in accordance with the guidelines presented in SOP 01 *Sample Custody* and SOP 02 *Packaging and Shipping Environmental Samples* (Attachment 1).

3.0 Special Training Requirements

As specified in the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements (Title 29 CFR 1910.120), routine training applies to those conducting fieldwork. The regulation states that all personnel involved in the characterization or remediation of an uncontrolled hazardous waste site must have 40 hours of certified training and three days of supervised field experience. In compliance with Title 29 CFR 1910.120, “general site workers,” those individuals performing field activities such as collecting media samples, will have completed the appropriate OSHA HAZWOPER training course.

Personnel on-site for occasional inspection and sampling activities are unlikely to experience exposure over the permissible and published exposure limits. They may be considered “workers on site only occasionally for a specific limited task.” These workers must have 24 hours of training and one day of field experience. Employees with minimal (low risk) exposure or low probability of exposure to hazardous substances are covered by other OSHA standards, such as the Hazard Communication Standard, Title 29 CFR 1910.120.

All site workers will be 40-hour trained and meet the minimum standard for supervised field experience. In compliance with regulatory procedures related to training, at least one supervisor, having received the OSHA 8-hr Hazardous Waste Supervisor training, will be on-site at all times. All employees have been trained in first aid and cardiopulmonary resuscitation (CPR). At least one employee, properly trained and certified in adult first aid and CPR, will be assigned and on-site at all times work is being performed.

4.0 Field Sampling Tables

Sampling Containers and Preservation Requirements:

Matrix	Analyte	Sample Volume	Container	Preservation	Holding Time (Prep/Analysis)
Groundwater	Nitrate/Nitrite	250-ml	250-ml HDPE	pH<2, H_2SO_4 4 ± 2°C	28 days (total) 48 hours (nitrate or nitrite, singly)
	Perchlorate	125-ml	125-ml HDPE	4 ± 2°C	28 days
	Explosives	1-Liter	1-Liter Amber Glass	4 ± 2°C	7 days / 40 days
	White Phosphorus	125-ml	125-ml HDPE	4 ± 2°C	5 days / 30 days
	Ammonia	250-ml	250-ml HDPE	pH<2, H_2SO_4 4 ± 2°C	28 days
	TPH-GRO	(2) 40-ml	40-ml Vial	pH<2, HCl 4 ± 2°C	14 days
	TPH-DRO/ORO	1-Liter	1-Liter Amber Glass	4 ± 2°C	7 days / 40 days
	Metals	250-ml	250-ml HDPE	HNO_3 4 ± 2°C	180 days
	VOCs	(3) 40-ml	40-ml Vial	pH<2, HCl 4 ± 2°C	14 days
	SVOCs	1-Liter	1-Liter Amber Glass	4 ± 2°C	7 days / 40 days

Notes:

ºC = degrees Celsius; DRO = diesel range organics; GRO = gasoline range organics; HCl = hydrochloric acid; HDPE = high-density polyethylene; HNO_3 = nitric acid; H_2SO_4 = sulfuric acid; ml = milliliter; ORO = oil range organics; SVOC = semi-volatile organic compound; TPH = total petroleum hydrocarbon; VOC = volatile organic compound

Field Quality Control Sample Summary

Matrix	Analytical Group	Number of Samples[1]	Number of Field Duplicates (10%)[2]	Number of MS/MSDs (5%)[3]	Field Blanks	Trip Blanks[2]	Equip. Blanks	Temperature Blanks	Total Number of Samples to Lab
Groundwater	Nitrate/Nitrite	1	1	1/1	1	0	1	One per cooler	6
	Perchlorate	1	1	1/1	1	0	1		6
	Explosives	1	1	1/1	1	0	1		6
	White Phosphorus	1	1	1/1	1	0	1		6
	Ammonia	1	1	1/1	1	0	1		6
	TPH-GRO	1	1	1/1	1	0	1		6
	TPH-DRO/ORO	1	1	1/1	1	0	1		6
	Metals	1	1	1/1	1	0	1		6
	VOCs	1	1	1/1	1	1	1		7
	SVOCs	1	1	1/1	1	0	1		6

Notes:
[1] The number of samples assumes 1 day of field sampling activities.
[2] One per ice chest containing VOC samples.
[3] One MS/MSD sample per 20 samples or one for each sampling event

DRO = diesel range organics; GRO = gasoline range organics; MS/MSD = matrix spike/matrix spike duplicate; ORO = oil range organics; SVOC = semi-volatile organic compound; TPH = total petroleum hydrocarbon; VOC = volatile organic compound

5.0 Field Procedures

All project-specific tasks and procedures will be performed in accordance with the following field SOPs (Attachment 1).

- SOP 01 – Sample Custody
- SOP 02 – Packaging and Shipping Environmental Samples
- SOP 03 – Field Logbook Content and Control
- SOP 04 – Field Sample Numbering
- SOP 09 – Low-Flow Sampling
- SOP 10 – Decontamination of Field Equipment

6.0 Sample Handling and Custody Requirements

To provide a method of tracking each sample through collection, analysis, data review, and data reduction, a sample identification (ID) system has been established for the MTR sampling activities. Sample IDs will be assigned in the field according to the following system:

- A designation of the quarter and year, followed by the well ID and a hyphen.
  0325MTR-MW1-
- A designation for the sample number, followed by a hyphen.
  0325MTR-MW1-01-
- A designation for the sample type (i.e., primary [1]).

An example of the sample ID is:

0325MTR-MW1-01-1

[Sample Types: 1 = primary, 2 = duplicate, 3 = equipment blank, 4 = trip blank, 5 = field blank]

Field QC samples subjected to chemical analysis, such as EBs, FBs, and trip blanks (TB), will be sequentially numbered as collected in the field with site characterization samples. Field QC samples will be submitted to the laboratory under blind identification. Field QC samples will not be identified as QC samples in the sample name or on the Chain of Custody (COC).

MS/MSD samples will be labeled primary samples (sample type 1). MS/MSDs provide additional primary sample volume for laboratory use and should not be submitted as separate samples. The MS/MSD sample containers may include a designation on the container lid or sample label of “MS” and “MSD.” These samples should also be notated in the comments section for the primary sample on the COC.

In the following hypothetical example, the samples collected at the site are:

- A groundwater sample,
- A duplicate groundwater sample, and
- Following the sampling, a field blank is collected.

In accordance with the protocol described above, the samples would be named as follows:

- The groundwater sample: **0325MTR-MW1-01-1**
- The duplicate sample: **0325MTR-MW1-02-2**
- The field blank sample: **0325MTR-MW1-03-5**

Continuing with the hypothetical example, if the sampler then collected an equipment blank at the location, that sample would be named as follows:

- The equipment blank sample: **0325MTR-MW1-04-3**

Each sample collected will be labeled with the unique sample ID, date and time the sample was collected, preservation used, the sampler's initials, and the analysis to be performed. Each sample will then be logged onto a COC form for delivery to the laboratory. All samples will be sent to the laboratory via overnight courier delivery (i.e., FedEx). Temperature blanks will be labeled as temperature blanks. Temperature blanks are not subject to chemical analysis.

The field logbook will document cross-reference information regarding the assigned sample identification number and whether the sample is a field quality control sample. These logbooks will be maintained in the project file.

7.0 Field Instrument, Equipment, and Supplies (Testing and Maintenance Requirements)

Field Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
YSI ProDSS 4 (Water Quality Meter)	Visual Inspection	Daily, prior to sampling activity	Parts and materials should not be damaged.	If there is any damage, contact YSI customer service center	Field Team Lead	YSI ProDSS User Manual
	Maintenance	Daily, prior to sampling activity. Maintenance check at end of day	Clean keypad, connectors, ports, and sensors	Wipe with a dampened cloth	Field Team Lead	YSI ProDSS User Manual
	Charging	Daily, prior to sampling activity	Battery should be charged at least 50% prior to the start of fieldwork.	It is recommended to recharge the instrument upon returning from fieldwork.	Field Team Lead	YSI ProDSS User Manual
	Calibration	Daily, prior to sampling activity and as needed	Conductivity (freshwater 1,000 to 10,000 µS; salt water 50,000 µS) True (uncorrected) barometer reading = 760 mmHg Dissolved oxygen, pH, ORP, and depth- white line on graph shows no significant change for 40 seconds Turbidity- 1 point (0-1 NTU); 2-point (5-200 NTU); 3-point (400-4200 NTU)	Recalibrate until acceptable range or return to the manufacturer for repair	Field Team Lead	YSI ProDSS User Manual

Field Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
YSI ProDSS 4 (Water Quality Meter)	Calibration	Daily, prior to sampling activity and as needed	ISE sensor – Ammonium and nitrate values should be 90 to 130 mV between 1 mg/L and 100 mg/L. Chloride should be 80 to 130 mV between 10 mg/L and 1,000 mg/L. The slope for ammonium should be 45 to 65 mV. The slope for nitrate and chloride should be -40 to -65. Actual measurements may vary based on the model. Follow criteria recommended by the manufacturer or supplier.	Recalibrate until acceptable range or return to the manufacturer for repair	Field Team Lead	YSI ProDSS User Manual
Photoionization Detector (PID)	Calibration	Daily	Calibrate to known standards	Return to manufacturer for repair; Replace with rental unit	Field Team Lead	Manufacturer User Manual

Notes:

Rental equipment and instruments are frequently used in the field. The rental firms will be responsible for the proper care, maintenance, and repair of these items, and for tracking and documenting equipment and instrument maintenance and repairs.

8.0 Field Implementation (Field Instructions)

This section presents the field activities during groundwater monitoring at the MTR.

8.1 Field Tasks

Field activities include the following:

- Groundwater monitoring in the existing groundwater monitoring well
- Equipment Decontamination
- Remediation-derived waste management

8.1.1 Pre-Field Activities

Prior to the initiation of fieldwork, site reconnaissance and preparation will be performed to understand where key features are located. Reconnaissance will include verifying the hospital location, identifying access points to restricted areas, the well location, base support facilities, and other key features. Preparation will involve setting up equipment and the work area (e.g., decontamination) as appropriate.

8.1.2 Groundwater Monitoring

The annual groundwater sampling event will be performed using the low-flow sampling method and the monitoring well will be purged and sampled using a portable bladder pump with disposable low-density polyethylene tubing. Groundwater samples will be collected from one groundwater monitoring well (MTR-MW1) (Figure 2).

If applicable, field equipment will be calibrated before and after the sampling event. All sampling and measuring equipment will be decontaminated before gauging and sampling each well. The water level measurement will be recorded before purging and during sampling. The depth to groundwater measurements will be taken from a reference point at the top of the well casing and reported in feet below top of casing. The water levels will be measured to the nearest 0.01 foot.

The low-flow method consists of purging the well at a flow rate at or below the recharge capacity of the aquifer. This process is based on purging and sampling procedures provided by USEPA (2017). Low-flow purging and sampling involves extracting groundwater at less than 500 milliliters per minute (mL/min), so there is little to no water level drawdown. This low-flow rate also limits the mixing of stagnant water in the casing above the screen or the sump with water in the screened interval. The low-flow method facilitates equilibrium with the surrounding formation to produce groundwater samples

representative of the aquifer formation water.

Water quality field parameters (turbidity, pH, dissolved oxygen [DO], electrical conductivity [EC], temperature, and oxidation-reduction potential [ORP]) in the purged water will be monitored and recorded. Stabilization of these field parameters will be verified before a sample is collected. A multi-probe water quality meter with a flow-through cell will monitor the field parameters. Additionally, the water level, purge volume, depth to water, and drawdown will be recorded. All field parameters will be recorded on a groundwater sampling field form. Measurements will be recorded every 2 to 3 minutes and will continue until the parameters have stabilized to within 10%. The well will be sampled immediately following water quality parameter stabilization. The purged groundwater will be poured back into the well upon completion of sampling.

If the recovery rate of the well is less than 50 mL/min, or if the well is essentially dewatered during purging, the well will be sampled as soon as the water level has recovered sufficiently to collect the volume needed for all anticipated samples. If this occurs, the Field Team Leader will document the deviation (i.e., how the sample was sampled and why) on the groundwater sampling field form or in the field logbook.

Groundwater samples will be sent to a laboratory certified by the DoD ELAP and the State of Arizona for analyses listed in Section 10.0.

8.2 Equipment Decontamination

The equipment decontamination procedures are based on guidelines appropriate for low-level contamination. Non-dedicated (reusable) sampling equipment will be decontaminated to ensure the quality and integrity of the samples collected. Decontamination procedures are discussed in detail in SOP 10 (Attachment 1).

All reusable equipment (e.g., level measurement and groundwater sampling) will be decontaminated using Liquinox® or Alconox® cleaning solution between sample collection and at the end of each day of fieldwork. After using the cleaning solutions, reusable equipment will be triple-rinsed with deionized water.

Reusable personal protective equipment shall be inspected for indications of defects and contamination. If indications of contamination are detected on these materials, they will be decontaminated so they can be reused. If defects are identified, reusable personal protective equipment will be disposed of as municipal waste.

Disposable chemical-resistant gloves (i.e., nitrile gloves) will be placed in plastic trash bags and disposed of as municipal waste. Field personnel should wash their hands and shower after leaving the site.

8.3 Remediation-Derived Waste Management

The following waste streams are anticipated to be generated during groundwater monitoring and remediation:

- Personal protective equipment and general debris
- Equipment decontamination

Liquids produced by this project will be containerized and stored in Department of Transportation-approved drums. Drummed liquid waste will be stored temporarily on double containment pallets or within a liquid waste containment area. Nonhazardous solid waste will be disposed of as municipal waste or, if possible, recycled. Nonhazardous personal protective equipment, general debris, and decontaminated waste materials will be disposed of at the end of each day and will not be accumulated.

Waste disposal will be determined based on the analytical results of the media in question. Contaminated waste will be transported to an authorized disposal facility following local, state, and federal regulations.

8.4 Field Quality Control Sampling

QA is an integrated system of activities in quality planning, assessment, and improvement to provide the project with a measurable assurance that the established standards of quality are met. QC checks, including field and laboratory, are specific operational techniques and activities to fulfill the QA requirements.

Field QC samples each quarter will include a field duplicate, equipment blank, trip blank, and field blank. Although technically considered laboratory QC samples, matrix spike (MS) and matrix spike duplicate (MSD) samples will also be collected in the field. QC samples will be collected at the frequencies described in Section 4.0.

8.4.1 Field Duplicate

One field duplicate/replicate sample will be collected during each sampling event. Field duplicate samples are collected in the same quantity at the same time, location, and conditions. Field duplicates provide information regarding the reproducibility of the analytical results and account for errors introduced by handling, shipping, preparing, and analyzing field samples.

8.4.2 Equipment Blank

An equipment blank (EB) will be collected at a rate of one per day when non-disposable

field sampling equipment is decontaminated. EBs are samples of DI water exposed to the surface of non-dedicated decontaminated sampling equipment. The EB is collected during the final rinse of the sampling equipment after decontamination procedures are performed. EBs are analyzed for the same parameters as field samples to evaluate the effectiveness of field decontamination procedures.

8.4.3 Trip Blank

Each cooler containing VOC samples shipped to the laboratory will include a trip blank. Trip blanks are used when the collection of VOC samples is required and serve to detect and identify any VOC contaminant in the samples while traveling to the lab. This blank represents the “trip” the volatile vials take from leaving the laboratory with the bottle order to the field for sample collection and back to the lab for testing. The laboratory creates trip blanks by filling volatile vial containers with laboratory-grade DI water and sealing the container. The laboratory will provide trip blanks, which will not be opened until they return to the lab for testing.

8.4.4 Field blank

One field blank will be collected and analyzed per sampling event per water source. Field blanks are analyzed to assess contamination introduced during field sampling procedures and sample shipment. Field blanks, consisting of samples of the source water used, will be analyzed to evaluate whether the wash or rinse water contained contaminants that may have been carried over into the samples.

8.4.5 Matrix Spike and Matrix Spike Duplicate Samples

MS and MSD samples are designed to check the precision and accuracy of the analytical methods through the analysis of a field sample with a known amount of analyte added (spiked). The additional sample volume of MS and MSD samples is collected in the field in the same manner as field samples. In the laboratory, two portions of the sample are spiked with a standard solution of target analytes. MS and MSD samples are analyzed for the same parameters as the field samples, and analytical results will be evaluated for the precision and accuracy of the laboratory process and the effects of the sample matrix. MS/MSD samples are collected at one per 20 field samples.

8.5 Field Documentation

All field data will be recorded in ink on the forms listed below. The Field Team Lead or designee will review field data and records. Instrument selections and use, including calibration and standardization, field deviations, and sampling limitations, will be recorded

on the daily field log. A bound field logbook may be used instead of the daily field log to document daily field activities.

The reviewer will initialize field records before they are incorporated into reports or used in program decisions. Changes or corrections to field form entries will be completed by striking out the incorrect entry with a single line, initialing (by the person correcting), and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information should be written clearly above the crossed-out item.

Daily activities will be recorded using the following field documentation:

- Field logbook/field forms
- Well-purging form
- Sample collection log
- Chain-of-custody form

Field logbooks, field forms, chain-of-custody forms, correspondence, and project reports will be maintained in electronic format at the completion of the project.

8.6 Field SOPs Reference Table

SOP Number	Title	Revision Date	Location of SOP	Deviations for Project Work	Comments
SOP 01	Sample Custody	9/20/2021	Attachment 1	None	None
SOP 02	Packaging and Shipping Environmental Samples	9/20/2021		None	None
SOP 03	Field Logbook Content and Control	9/20/2021		None	None
SOP 04	Field Sample Numbering	9/20/2021		None	None
SOP 09	Low-Flow Sampling	9/20/2021		None	None
SOP 10	Decontamination of Field Equipment	9/20/2021		None	None

Notes:
Copies of field SOPs are provided in Attachment 1.

SOP = standard operating procedure

8.7 Sample Details Table

Sampling Location	Matrix	Depth (feet bgs)	Analytical Groups	Number of Samples
Monitoring Well MTR-MW1	Groundwater	139	Nitrate/Nitrite Perchlorate Explosives White Phosphorus Ammonia TPH-GRO TPH-DRO/ORO Metals SVOCs VOCs	1 primary 1 duplicate 1 MS/MSD pair Other QC samples, as required

Notes:
bgs = below ground surface; DRO = diesel range organics; GRO = gasoline range organics; ORO = oil range organics; TPH = total petroleum hydrocarbon

9.0 Reference Limits and Screening Criteria

Matrix: Groundwater
Analytical Group: Nitrate/Nitrite
Analytical Method: USEPA Method 353.3

Analyte	CAS Number	Project Screening Criteria (mg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/L)	Laboratory Limits	
					RL (mg/L)	MDL (mg/L)
Nitrate	14797-55-8	10	MCL	0.05	0.05	0.02
Nitrite	14797-65-0	1	MCL	0.05	0.05	0.02

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
mg/L = milligram per liter; MCL = maximum contaminant level; MDL = method detection limit; RL = reporting limit

Matrix: Groundwater
Analytical Group: Perchlorate
Analytical Method: USEPA Method 6850

Analyte	CAS Number	Project Screening Criteria	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
Perchlorate	14797-73-0	NE	NA	0.5	0.5	0.1

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/L = microgram per liter; MDL = method detection limit; RL = reporting limit; NA = not applicable; NE = not established

Matrix: Groundwater
Analytical Group: White Phosphorus
Analytical Method: USEPA Method 7580

Analyte	CAS Number	Project Screening Criteria	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
White Phosphorus	7723-14-0	NE	NA	0.1	0.1	0.02

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/L = microgram per liter; MDL = method detection limit; RL = reporting limit; NA = not applicable; NE = not established

Matrix: Groundwater
Analytical Group: Explosives
Analytical Method: USEPA Method 8330

Analyte	CAS Number	Project Screening Criteria	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
HMX	2691-41-0	NE	NA	1	1	0.2
RDX	121-82-4	NE	NA	1	1	0.2
1,3,5-TNB	99-35-4	NE	NA	1	1	0.2
1,3-DNB	99-65-0	NE	NA	1	1	0.2
2,4-DNT	121-14-2	NE	NA	1	1	0.2
2,6-DNT	606-20-2	NE	NA	1	1	0.2
2,4,6-TNT	118-96-7	NE	NA	1	1	0.2
2-AM-4,6-DNT	35572-78-2	NE	NA	1	1	0.2
2-Nitrotoluene	88-72-2	NE	NA	1	1	0.2
3-Nitrotoluene	99-08-1	NE	NA	1	1	0.2
4-AM-2,6-DNT	19406-51-0	NE	NA	1	1	0.2
4-Nitrotoluene	99-99-0	NE	NA	1	1	0.2
Tetryl	479-45-8	NE	NA	1	1	0.2
Nitrobenzene	98-95-3	NE	NA	1	1	0.2
Nitroglycerin	55-63-0	NE	NA	125	125	62.5
Pentaerythritol tetranitrate	78-11-5	NE	NA	125	125	62.5
3,5-Dinitroaniline	618-87-1	NE	NA	1	1	0.2

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/L = microgram per liter; MDL = method detection limit; RL = reporting limit; NA = not applicable; NE = not established

Matrix: Groundwater
Analytical Group: Ammonia
Analytical Method: USEPA Method 1690

Analyte	CAS Number	Project Screening Criteria	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/L)	Laboratory Limits	
					RL (mg/L)	MDL (mg/L)
Ammonia	766-41-7	NE	NA	0.1	0.1	0.06

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
mg/L = milligram per liter; MDL = method detection limit; RL = reporting limit; NA = not applicable; NE = not established

Matrix: Groundwater
Analytical Group: TPH-GRO
Analytical Method: USEPA Method 5030B/8015B

Analyte	CAS Number	Project Screening Criteria (mg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/L)	Laboratory Limits	
					RL (mg/L)	MDL (mg/L)
TPH-gas	8006-61-9	100	AWQS	0.1	0.1	0.01

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
mg/L = milligram per liter; AWQS = Aquifer Water Quality Standard; MDL = method detection limit; RL = reporting limit

Matrix: Groundwater
Analytical Group: TPH-DRO/ORO
Analytical Method: USEPA Method 3550B/8015AZ

Analyte	CAS Number	Project Screening Criteria (mg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/L)	Laboratory Limits	
					RL (mg/L)	MDL (mg/L)
TPH-DRO		100	AWQS	0.5	0.5	0.05
TPH-ORO		500	AWQS	0.5	0.5	0.05

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
mg/L = milligram per liter; AWQS = Aquifer Water Quality Standard; MDL = method detection limit; RL = reporting limit

Matrix: Groundwater
Analytical Group: Metals
Analytical Method: USEPA Method 6020B/7470A

Analyte	CAS Number	Project Screening Criteria (µg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
Aluminum	7429-90-5	NE	NA	100	100	20
Antimony	7440-36-0	6	MCL	1	1	0.5
Arsenic	7440-38-2	10	MCL	1	1	0.2
Barium	7440-39-3	2,000	MCL	1	1	0.5
Beryllium	7440-41-7	4	MCL	1	1	0.1
Cadmium	7440-43-9	5	MCL	1	1	0.2
Calcium	7440-70-2	NE	NA	100	100	25
Chromium	7440-47-3	100	MCL	1	1	0.2
Cobalt	7440-48-4	NE	NA	1	1	0.2
Copper	7440-50-8	1,300	MCL	1	1	0.5
Iron	7439-89-6	NE	NA	100	100	10
Lead	7439-92-1	15	MCL	1	1	0.1
Magnesium	7439-95-4	NE	NA	100	100	10
Manganese	7439-96-5	NE	NA	1	1	0.2
Mercury	7439-97-6	2	MCL	1	1	0.2
Molybdenum	7439-98-7	NE	NA	2	2	0.5
Nickel	7440-02-0	100	AWQS	1	1	0.2
Potassium	7440-09-7	NE	NA	100	100	20
Selenium	7782-49-2	50	MCL	1	1	0.3
Silver	7440-22-4	NE	NA	1	1	0.2
Sodium	7440-23-5	NE	NA	100	100	50
Thallium	7440-28-0	2	MCL	1	1	0.2
Vanadium	7440-62-2	NE	NA	1	1	0.5
Zinc	7440-66-6	NE	NA	20	20	10

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.

µg/L = microgram per liter; AWQS = Aquifer Water Quality Standard; MCL = maximum contaminant level; MDL = method detection limit; NA = not applicable; NE = not established; RL = reporting limit

Matrix: Groundwater
Analytical Group: VOCs
Analytical Method: USEPA Method 8260D

Analyte	CAS Number	Project Screening Criteria (µg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					LOD (µg/L)	DL (µg/L)
Acetone	67-64-1	NE	NA	10	10	5
Benzene	71-43-2	5	MCL	1	1	0.2
Bromobenzene	108-86-1	NE	NA	1	1	0.2
Bromochloromethane	74-97-5	NE	NA	1	1	0.2
Bromodichloromethane	75-27-4	80	MCL	1	1	0.2
Bromoform	75-25-2	80	MCL	1	1	0.3
Bromomethane	74-83-9	NE	NA	1	1	0.3
2-Butanone (MEK)	78-93-3	NE	NA	10	10	4
n-Butylbenzene	104-51-8	NE	NA	1	1	0.2
sec-Butylbenzene	135-98-8	NE	NA	1	1	0.2
tert-Butylbenzene	98-06-6	NE	NA	1	1	0.2
Carbon disulfide	75-15-0	NE	NA	1	1	0.5
Carbon tetrachloride	56-23-5	5	MCL	1	1	0.2
Chlorobenzene	108-90-7	100	MCL	1	1	0.2
Chloroethane	75-00-3	NE	NA	1	1	0.3
Chloroform	67-66-3	NE	NA	1	1	0.2
Chloromethane	74-87-3	NE	NA	1	1	0.3
2-Chlorotoluene	95-49-8	NE	NA	1	1	0.2
4-Chlorotoluene	106-43-4	NE	NA	1	1	0.2
Dibromochloromethane	124-48-1	80	MCL	1	1	0.2
1,2-Dibromo-3-chloropropane	96-12-8	0.2	MCL	2	2	0.5
1,2-Dibromoethane	106-93-4	500	MCL	1	1	0.2
Dibromoethane	74-95-3	NE	NA	1	1	0.2
1,1-Dichloroethane	75-34-3	NE	NA	1	1	0.2
1,2-Dichloroethane	107-06-2	5	MCL	1	1	0.2
1,2-Dichlorobenzene	95-50-1	600	MCL	1	1	0.2
1,3-Dichlorobenzene	541-73-1	NE	NA	1	1	0.2
1,4-Dichlorobenzene	106-46-7	75	MCL	1	1	0.2

VOCs by 8260D / Water - Continued

Analyte	CAS Number	Project Screening Criteria (µg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					LOD (µg/L)	DL (µg/L)
Dichlorodifluoromethane	7571-8	NE	NA	1	1	0.3
1,1-Dichloroethene	75-35-4	7	MCL	1	1	0.2
cis-1,2-Dichloroethene	156-59-2	70	MCL	1	1	0.2
trans-1,2-Dichloroethene	156-60-5	100	MCL	1	1	0.2
1,1-Dichloropropene	563-58-6	NE	NA	1	1	0.2
1,2-Dichloropropane	78-87-5	5	MCL	1	1	0.2
1,3-Dichloropropane	142-28-9	NE	NA	1	1	0.2
2,2-Dichloropropane	594-20-7	NE	NA	1	1	0.2
cis-1,3-Dichloropropene	10061-01-5	NE	NA	1	1	0.2
trans-1,3-Dichloropropene	10061-02-6	NE	NA	1	1	0.2
Ethylbenzene	100-41-4	700	MCL	1	1	0.2
2-Hexanone (MBK)	591-78-6	NE	NA	10	10	4
Hexachlorobutadiene	87-68-3	50	MCL	1	1	0.3
Isopropylbenzene	98-82-8	NE	NA	1	1	0.2
p-Isopropyltoluene	99-87-6	NE	NA	1	1	0.2
Methylene Chloride	75-09-2	NE	NA	2	2	1
4-Methyl-2-pentanone(MIBK)	108-10-1	NE	NA	10	10	4
tert-Butyl methyl ether	1634-04-4	NE	NA	1	1	0.2
Naphthalene	91-20-3	NE	NA	2	2	1
n-Propylbenzene	103-65-1	NE	NA	1	1	0.2
Styrene	100-42-5	100	MCL	1	1	0.5
1,1,1,2-Tetrachloroethane	630-20-6	NE	NA	1	1	0.2
1,1,2,2-Tetrachloroethane	79-34-5	NE	NA	1	1	0.2
Tetrachloroethene	127-18-4	5	MCL	1	1	0.2
Toluene	108-88-3	1,000	MCL	1	1	0.2
1,1,1-Trichloroethane	71-55-6	200	MCL	1	1	0.2
1,1,2-Trichloroethane	79-00-5	5	MCL	1	1	0.2
1,2,3-Trichlorobenzene	87-61-6	NE	NA	1	1	0.3

VOCs by 8260D / Water - Continued

Analyte	CAS Number	Project Screening Criteria (µg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
1,2,4-Trichlorobenzene	120-82-1	70	MCL	1	1	0.3
Trichloroethene	79-01-6	5	MCL	1	1	0.2
Trichlorofluoromethane	75-69-4	NE	NA	1	1	0.3
1,2,3-Trichloropropane	96-18-4	NE	NA	2	2	0.5
1,2,4-Trimethylbenzene	95-63-6	NE	NA	1	1	0.2
1,3,5-Trimethylbenzene	108-67-8	NE	NA	1	1	0.2
Vinyl Chloride	75-01-4	2	MCL	1	1	0.2
m-Xylene & p-xylene	136777-61-2	NE	NA	2	2	0.4
o-Xylene	95-47-6	NE	NA	1	1	0.2

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.

µg/L = microgram per liter; MCL = maximum contaminant level; MDL = method detection limit; NA = not applicable; NE = not established; RL = reporting limit; VOC = volatile organic compound

Matrix: Groundwater
Analytical Group: SVOCs
Analytical Method: USEPA Method 8270

Analyte	CAS Number	Project Screening Criteria (µg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
Acenaphthene	83-32-9	370	AWQS	10	10	5
Acenaphthylene	208-96-8	NE	NA	10	10	5
Anthracene	120-12-7	1,800	AWQS	10	10	5
Azobenzene	103-33-3	NE	NA	10	10	5
Benzo(a)anthracene	56-55-3	0.02	AWQS	10	10	5
Benzo(a)pyrene	50-32-8	0.2	MCL	10	10	5
Benzo(b)fluoranthene	205-99-2	0.02	AWQS	10	10	5
Benzo(g,h,i)perylene	191-24-2	NE	NA	10	10	5
Benzo(k)fluoranthene	207-08-9	0.2	AWQS	10	10	5
Benzyl Alcohol	100-51-6	NE	NA	10	10	5
Bis(2-chloroethoxy)methane	111-91-1	NE	NA	10	10	5
Bis(2-chloroethyl)ether	111-44-4	NE	NA	10	10	5

SVOCs by 8270 / Water - Continued

Analyte	CAS Number	Project Screening Criteria[1] (µg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
Bis(2-chloroisopropyl)ether	108-60-1	NE	NA	10	10	5
Bis(2-Ethylhexyl)phthalate	117-81-7	6	MCL	10	10	5
4-Bromophenyl-phenylether	101-55-3	NE	NA	10	10	5
Butylbenzylphthalate	85-68-7	NE	NA	10	10	5
Carbazole	86-74-8	NE	NA	10	10	5
4-Chloro-3-methylphenol	59-50-7	NE	NA	10	10	5
4-Chloroaniline	106-47-8	NE	NA	10	10	5
2-Chloronaphthalene	91-58-7	NE	NA	10	10	5
2-Chlorophenol	95-57-8	NE	NA	10	10	5
4-Chlorophenyl-phenylether	7005-72-3	NE	NA	10	10	5
Chrysene	218-01-9	1.5	AWQS	10	10	5
Dibenzo(a,h)anthracene	53-70-3	0.002	AWQS	10	10	5
Dibenzofuran	132-64-9	NE	NA	10	10	5
1,2-Dichlorobenzene	95-50-1	600	MCL	10	10	5
1,3-Dichlorobenzene	541-73-1	NE	NA	10	10	5
1,4-Dichlorobenzene	106-46-7	75	MCL	10	10	5
3,3'-Dichlorobenzidine	91-94-1	NE	NA	10	10	5
2,4-Dichlorophenol	120-83-2	NE	NA	10	10	5
Diethylphthalate	84-66-2	NE	NA	10	10	5
2,4-Dimethylphenol	105-67-9	NE	NA	10	10	5
Dimethylphthalate	131-11-3	NE	NA	10	10	5
Di-n-butylphthalate	84-74-2	NE	NA	10	10	5
4,6-Dinitro-2-methylphenol	534-52-1	NE	NA	20	20	5
2,4-Dinitrophenol	51-28-5	NE	NA	20	20	5
2,4-Dinitrotoluene	121-14-2	NE	NA	10	10	5
2,6-Dinitrotoluene	606-20-2	NE	NA	10	10	5
Di-n-octylphthalate	117-84-0	NE	NA	10	10	5

Analyte	CAS Number	Project Screening Criteria (µg/L)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/L)	Laboratory Limits	
					RL (µg/L)	MDL (µg/L)
Fluoranthene	206-44-0	240	AWQS	10	10	5
Fluorene	86-73-7	240	AWQS	10	10	5
Hexachlorobenzene	118-74-1	1	MCL	10	10	5
Hexachlorobutadiene	87-68-3	NE	NA	10	10	5
Hexachloroethane	67-72-1	NE	NA	10	10	5
Indeno(1,2,3-cd)pyrene	193-39-5	0.02	AWQS	10	10	5
Isophorone	78-59-1	NE	NA	10	10	5
2-Methylnaphthalene	91-57-6	NE	NA	10	10	5
2-Methylphenol	95-48-7	NE	NA	10	10	5
4-Methylphenol	106-44-5	NE	NA	10	10	5
Naphthalene	91-20-3	6	AWQS	10	10	5
2-Nitroaniline	88-74-4	NE	NA	10	10	5
3-Nitroaniline	99-09-2	NE	NA	10	10	5
4-Nitroaniline	100-01-6	NE	NA	10	10	5
Nitrobenzene	98-95-3	NE	NA	10	10	5
2-Nitrophenol	88-75-5	NE	NA	10	10	5
4-Nitrophenol	100-02-7	NE	NA	20	20	5
n-Nitrosodimethylamine	62-75-9	NE	NA	10	10	5
n-Nitroso-di-n-propylamine	621-64-7	NE	NA	10	10	5
n-Nitrosodiphenylamine	86-30-6	NE	NA	10	10	5
Pentachlorophenol	87-86-5	1	MCL	20	20	5
Phenanthrene	85-01-8	NE	NA	10	10	5
Phenol	108-95-2	NE	NA	10	10	5
Pyrene	129-00-0	NE	NA	10	10	5
1,2,4-Trichlorobenzene	120-82-1	70	AWQS	10	10	5
2,4,5-Trichlorophenol	95-95-4	NE	NA	10	10	5
2,4,6-Trichlorophenol	88-06-2	NE	NA	10	10	5

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.

µg/L = microgram per liter; AWQS = Aquifer Water Quality Standard; MCL = maximum contaminant level; MDL = method detection limit; NA = not applicable; NE = not established; RL = reporting limit

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10.0 Assessments/Oversight

Formal field audits by QA personnel are not anticipated for this project. Identifying problems related to technical performance will be the responsibility of the technical staff working on this project. The Field Team Leader will assess any issues in the field, modify technical procedures if needed, and communicate with the Project Manager and any technical staff. Any changes in technical procedures will be documented in field notes and highlighted in reports related to this project.

Laboratory personnel will perform self-audits and institute corrective actions in accordance with their respective written procedures.

11.0 Data Verification and Validation

Data Verification (Step I) Process Table

Data Review Input	Description	Responsible for Verification
Chain of Custody Forms (COC)	The content of the COC will be reviewed daily and verified for completeness against the samples within the associated cooler. Once reviewed, a copy of the COC form will be filed with other project documents in the assigned project file. The original COC form will be taped inside the cooler for sample shipment.	Field Team Lead or Alternate
Fieldnotes/ Logbook	Field sampling data, i.e., field logbooks and field forms, will be reviewed and verified for completeness. Field notes/logbook will be forwarded to the Project Manager, reviewed, and placed in the project file. The annual monitoring report will include a copy of the field notes.	Field Team Lead or Alternate
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the project file. If corrective actions are required, a copy of the documented corrective action taken will be attached to the appropriate audit report in the project file.	Field Team Lead or Alternate QA Coordinator or Alternate
Analytical Data Package	All laboratory data packages will be verified internally by the laboratory for completeness and technical accuracy before submission. All received data packages will be verified externally and internally according to the data validation process specified in the Validation (Steps II) Process Table below.	Laboratory PM QA Coordinator
Electronic Data Deliverables	The laboratory will internally verify 100% of electronic data deliverables for completeness and technical accuracy between the EDD and the PDF copy data package before submission. 10% of received electronic data deliverables will be verified externally and internally against the laboratory data packages, with the percentage raised to 100% if discrepancies are found during the 10% verification.	Laboratory PM QA Coordinator

COC = chain of custody; EDD = electronic data deliverable; QA = quality assurance; PM = project manager

Data Validation (Steps II) Process Table

Validation Input	Description	Responsible for Validation
Communication	Establish that the required communication procedures were followed by field or laboratory personnel.	QA Coordinator
Methods (sampling and analysis)	Establish that the required sampling and analytical methods were implemented and that any deviations were noted. Evaluate whether proper procedures met performance criteria.	QA Coordinator
Location, maps, and sample ID numbers	Verify the accuracy and precision of the information under scrutiny.	Field Team Lead PM
Holding times	Ensure samples were analyzed within the holding times specified in the method, procedure, or contract requirements. If holding times were not met, confirm that deviations were documented and appropriate notifications were made. Holding times or deviations will be noted in the lab analytical report.	QA Coordinator
List of project-specific analytes	Establish that the project-specific analytes were reported as specified in governing documents (i.e., analytical method, contract, etc.). Documentation will be in the lab analytical report.	QA Coordinator
Field logbook	Every week, the QA Coordinator or assignee will review and verify the completeness of the information in the field logbooks.	QA Coordinator or Alternate
Sampling instrument decontamination records	Establish that proper decontamination procedures were implemented by field sampling personnel.	QA Coordinator or Alternate
Chain of Custody Forms	Review COC records for completeness and accuracy daily. The QA Coordinator or assignee will look primarily for project information, sample analyses requested, and the number of field QC samples collected.	QA Coordinator or Alternate
Sample receipts	Check the sample cooler for compliance with temperature and packaging requirements.	QA Coordinator or Alternate

Validation Input	Description	Responsible for Validation
Sample logins	Review sample login for accuracy against the COC form.	QA Coordinator or Alternate
Sampling plan and procedures	Evaluate whether the sampling plan was executed as specified (i.e., the number, location, and type of field samples that were collected and analyzed as specified in the SAP). Evaluate whether sampling procedures were followed with respect to equipment and proper sampling support (i.e., techniques, equipment, decontamination, volume, preservation, temperature, etc.).	QA Coordinator or Alternate
Project quantitation limits	Determine that quantitation limits were achieved as outlined in the SAP and that the laboratory successfully analyzed a standard at the quantitation limit.	QA Coordinator
Performance criteria	Evaluate QC data against project-specific performance criteria in the SAP (i.e., evaluate quality parameters beyond those outlined in the methods).	QA Coordinator
Laboratory data packages	The QA Coordinator will validate laboratory data packages for technical accuracy. Review data packages for accuracy against the laboratory data.	QA Coordinator

Notes:

COC = chain of custody; QA = quality assurance; QC = quality control; SAP = Sampling and Analysis Plan

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12.0 Data Usability

The data usability assessment process is used to evaluate and document the usability of the data by considering the project DQOs and whether the data are suitable during the decision-making process. The analytical laboratory will be responsible for reviewing all analytical data generated under this contract to ensure that they meet the requirements of the SAP. Each analyst reviews the quality of their work based on established protocols specified in laboratory SOPs, analytical method protocol, project-specific requirements, and DQOs.

The data quality assessment process intends to establish the usability of the results with respect to the project DQOs. The usability assessment process will involve the QA Coordinator reviewing and evaluating the data for discrepancies or deviations. This assessment will assess the impact of the discrepancies or deviations on the usability of the data and evaluate whether all the necessary information has been provided for use in the decision-making process. Documentation of deviations in sampling activities, COC documentation, or holding times; compromised samples (i.e., damaged samples) and the need to resample; or changes to SOPs or methods that could potentially impact data quality will be provided in the annual groundwater monitoring report. QC sample results will be evaluated to assess whether unacceptable QC results (e.g., blank detections) impact data usability. Data use limitations will be discussed in the data usability assessment for data that do not meet the DQOs.

13.0 Documentation and Records

Field notes and measurements will be recorded in a field notebook, which the Field Team Leader will maintain. The respective laboratories performing the analyses will maintain original copies of COCs, raw data, and analytical results.

At the end of each day, the Field Team Leader will prepare a summary of the sampling activities for the day. The summary will be in writing but may be submitted as a hard copy or electronically. The summary should include the following:

- Name of Field Team Leader and Team Members
- Field and QC samples collected (including times)
- On-site measurements made and results obtained at each location
- Disposition of all samples (where they were delivered for analysis)
- Air bill numbers for all shipped samples
- Photocopies of COC
- Noteworthy Site observations

14.0 Quality Control/Data Management

Data from this sampling effort will be generated from three primary pathways: field activities, laboratory analytical data, and validated data. Data generated during field activities will be recorded using a field logbook and field forms. The field manager will review these forms for compliance with QC criteria established in the SAP for completeness and accuracy.

Upon sample arrival, the analytical laboratory will verify each sample's physical condition and ensure that all pertinent documentation associated with each sample is complete. Data generated from the laboratory analysis will be recorded in electronic data deliverables. Analytical laboratory staff will verify the data according to the process described in Section 12.0. The laboratory QA director will review the data before it is submitted for third-party data validation. Details on data validation and usability are provided in Sections 11.0 and 12.0.

Hardcopy field records, analytical laboratory data, and electronic data deliverables will be stored in a secure project file.

15.0 References

United States Department of Defense (DoD). 2021. *Quality Systems Manual for Environmental Laboratories, Version 5.4*. October.

United States Environmental Protection Agency (USEPA). 2009. *National Primary Drinking Water Regulations.* EPA 816-F-09-004. May.

_____. 2017. *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells.* Revised on September 19.

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Figures

Figure 1: Area Location Map

Figure 2: MTR Site Location Map

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Figure 1: Area Location Map

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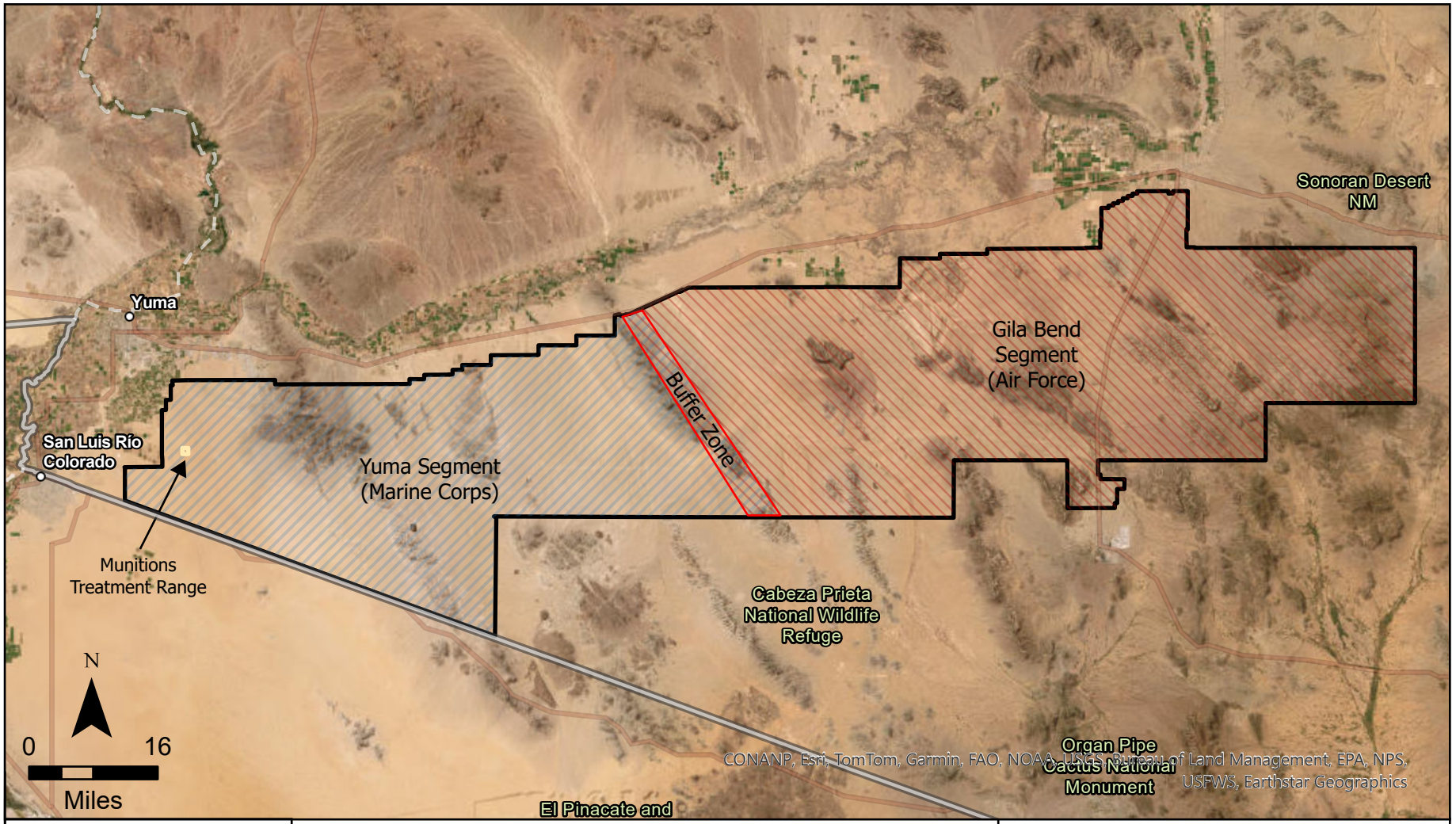

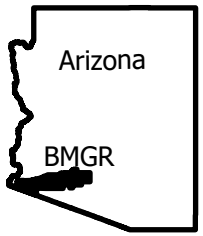

Munitions Treatment Range

Yuma Segment (Marine Corps)

Gila Bend Segment (Air Force)

Buffer Zone

BMGR Boundary

Figure 1
Area Location Map
Barry M. Goldwater Range

Figure 2: MTR Site Location Map

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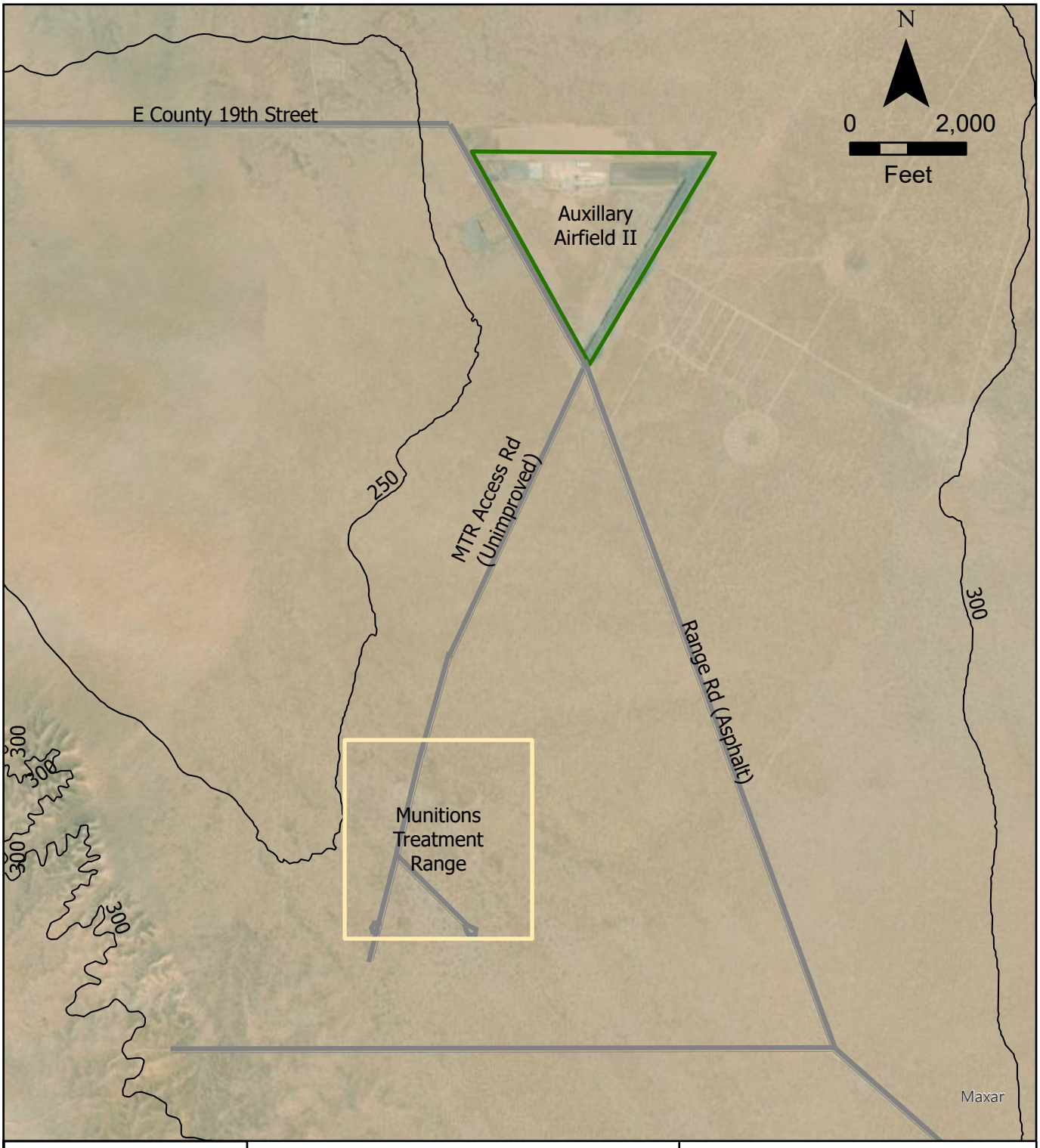

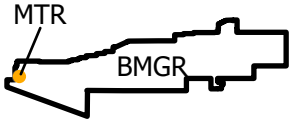

Munitions Treatment Range

Ground Elevation (feet)

Roads

Auxillary Airfield II

Figure 2
MTR Site Location Map
Barry M. Goldwater Range

Attachment 1: Standard Operating Procedures

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SOP 01

SAMPLE CUSTODY

1.0 Objective

Due to the evidentiary nature of samples collected during environmental investigations, possession must be traceable from the time the samples are collected until their derived data are introduced as evidence in legal proceedings. To maintain and document sample possession, sample custody procedures are followed. All paperwork associated with the sample custody procedures will be retained with the contactor's project files.

Note: This standard operating procedure (SOP) is intended to present basic sample custody requirements, along with common options. Specific sample custody requirements should be presented in the project-specific Sampling and Analysis Plan (SAP).

2.0 Background

2.1 Definitions

Sample – sample is material to be analyzed that is contained in single or multiple containers representing a unique sample identification number.

Sample Custody – A sample is under custody if:

1. It is in your possession
2. It is in your view, after being in your possession
3. It was in your possession and you locked it up
4. It is in a designated secure area

Chain-of-Custody Record – A chain-of-custody record is a form used to document the transfer of custody of samples from one individual to another.

Custody Seal – A custody seal is a tape-like seal that is part of the chain-of-custody process and is used to detect tampering with samples after they have been packed for shipping. A custody seal is placed on a filled and lidded sample container or a closed and sealed sample cooler. Some projects require each sample container to include a custody seal (if a sample cooler shows tampering with the custody seal, that cooler is flagged).

Sample Label – A sample label is an adhesive label placed on each sample containers to designate a sample identification number and other sampling information.

Sample Tag – A sample tag is attached with string to a sample container to designate a sample identification number and other sampling information. Tags may be used when it is not feasible to place adhesive labels on the container (e.g., in the case of small sampling tubes).

3.0 Responsibilities

Sampler – The sampler is personally responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

Field Team Leader – The field team leader (FTL) is responsible for ensuring that strict chain-of-custody procedures are maintained during all sampling events. The FTL is also responsible for coordinating with the subcontractor laboratory to ensure that adequate information is recorded on custody records. The FTL determines whether proper custody procedures were followed during fieldwork and decides if additional samples are required.

Field Sample Custodian – The field sample custodian, when designated by the FTL, is responsible for accepting custody of samples from the sampler(s) and properly packing and shipping the samples to the laboratory assigned to do the analyses. A field sample custodian is typically designated only for large and complex field efforts.

4.0 Required Supplies

- Chain-of-custody forms
- Sample labels
- Custody seals
- Clear tape

5.0 Procedures

5.1 Chain-of-Custody Record

This procedure establishes a method for maintaining custody of samples through use of a chain-of-custody record. This procedure will be followed for all samples collected or split samples accepted.

Field Custody

1. Collect only the number of samples needed to represent the media being sampled. If a project specific SAP is not available, determine the quantity and types of samples and sample locations prior to the actual fieldwork (refer to the appropriate governing agency for requirements [Arizona Department of Environmental Quality (ADEQ)]). As few people as possible should handle samples.
2. Complete sample labels or tags for each sample using indelible black or blue ink (or waterproof ink as appropriate). To reduce the potential for human error in the field, pre-printed labels are preferred, especially when sampling at a project site requiring a high number of sample containers.
3. Maintain personal custody of the samples (in your possession) at all times until custody is transferred for sample shipment or directly to the analytical laboratory.

Transfer of Custody and Shipment

1. Complete a chain-of-custody record for all samples. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the sample custodian in the appropriate laboratory. Duplicate information included on the chain-of-custody form in a project specific logbook or form. The process of duplication will assist in report preparation following the sampling event.

    - The date/time will be the same for both signatures when custody is transferred directly to another person. When samples are shipped via common carrier (e.g., Federal Express), the date/time will not be the same for both signatures. Common carriers are not required to sign the chain-of-custody record.
    - In all cases, it must be readily apparent that the person who received custody is the same person who relinquished custody to the next custodian.
    - Record a digital photograph of the completed chain-of-custody form for the project file and report preparation. Upload or e-mail the chain-of-custody photograph to the Project Manager or FTL as soon as possible.
    - If samples are left unattended or a person refuses to sign, this must be documented and explained on the chain-of custody record.

Note: If a field sample custodian has been designated, he/she may initiate the chain-of-custody record, sign, and date as the relinquisher. The individual sampler(s) must sign in the appropriate block, but does (do) not need to sign and date as a relinquisher.

2. Package samples properly for shipment and dispatch to the appropriate laboratory for analysis. The sample cooler should be packed with ice stored in Ziploc bags, to fill all remaining space. Each shipment must be accompanied by a separate chain-of-custody form sealed within a Ziploc bag and taped to the inside lid of the sample cooler record. If a shipment consists of multiple coolers, samples in the coolers may be recorded on a single chain-of-custody, with each cooler containing a chain-of-custody form as described in the previous sentence..
3. The original record will accompany the shipment, and the copies will be retained by the FTL and, if applicable, distributed to the appropriate sample coordinators. Freight bills will also be retained by the FTL as part of the permanent documentation. The shipping number from the freight bill shall be recorded on the applicable chain-of-custody record.

Procedure for Completing Chain-of-Custody Record

The following procedure is to be used to fill out the chain-of-custody record. The record provided herein is an example chain-of custody record. If another type of custody record (i.e., provided by the EPA contract laboratory program or a subcontract laboratory) is used to track the custody of samples, the custody record should be filled out in its entirety.

1. Record project number.
2. Record FTL for the project.
3. Record the name and address of the laboratory to which samples are being shipped.
4. Enter the project name/location or code number.
5. Record sample location number.
6. Note preservative added to the sample.
7. Record sample number.
8. Note preservatives added to the sample.
9. Note media type (matrix) of the sample.
10. Note sample type (grab or composite).
11. Enter date of sample collection.
12. Enter time of sample collection.
13. When required by the client, enter the names or initials of the samplers next to the sample location number of the sample they collected.
14. List parameters for analysis and the number of containers submitted for each analysis.
15. Enter matrix spike/matrix spike duplicate (MS/MSD) if sample is for laboratory quality control or other remarks (e.g., sample depth).
16. Sign the chain-of-custody record(s) in the space provided. All samplers must sign each record.
17. Review and fill out applicable areas as needed.
18. If sample tags are used, record the sample tag number in the “Remarks” column.
19. The originator checks information entered in Items 1 through 16 and then signs the top left “Relinquished by” box, prints his/her name, and enters the current date and time.
20. Send the complete chain of custody with the samples to the laboratory; Retain additional copies for the project file or distribute as required to the appropriate sample coordinators.
21. The laboratory sample custodian receiving the sample shipment checks the sample label information against the chain-of-custody record. Sample condition is checked and anything unusual is noted under “Remarks” on the chain-of custody record. The laboratory custodian receiving custody signs in the adjacent “Received by” box and keeps the copy.

5.2 Sample Labels and Tags

Unless the client directs otherwise, sample labels or tags will be used for all samples collected or accepted.

1. Complete on label or tag with the information required by the client for each sample container collected. A typical label or tag would be completed as follows:
   - Record the project code (i.e., project or task number).
   - Enter the station number (sample number) if applicable.
   - Record the date to indicate the month, day, and year of sample collection.
   - Enter the time (24 hour time format) of sample collection (3 pm is equivalent to 1500, whereas 3 am is equivalent to 0300).
   - Place a check to indicate composite of grab sample.
   - Record the station (sample) location.
   - Sign in the space provided.
   - Place a check next to 'yes" or "no" to indicate if a preservative was added.
   - Place a check under "Analyses" next to the parameters for which the sample is to be analyzed. If the desired analysis is not listed, write it in the empty slot. **Note**: Do not write in the box for "laboratory sample number."
   - Place or write additional relevant information under "Remarks."

2. Place adhesive labels directly on the sample containers. Place clear tape over the label to protect from moisture and to preserve the information on the label.
3. Double –check that the information recorded on the sample tag is consistent with the information recorded on the chain-of-custody. Sample labels should be checked in the field by at least two members of the sampling team.

5.3 Sample Shipping

The standard operating procedure listed below defines the requirements for packaging and shipping environmental samples.

- SOP 02, Packaging and Shipping Environmental Samples

SOP 2

PACKAGING AND SHIPPING ENVIRONMENTAL SAMPLES

1.0 Packaging and Shipping of All samples

This standard operating procedure (SOP) applies to the packaging and shipping of all environmental samples. If the sample is preserved or radioactive, the following sections may also be applicable.

Section 2.0-Packaging and Shipping Samples Preserved with Sodium Hydroxide
Section 3.0-Packaging and Shipping Samples Preserved with Hydrochloric Acid
Section 4.0-Packaging and Shipping Samples Preserved with Nitric Acid
Section 5.0-Packaging and Shipping Samples Preserved with Sulfuric Acid
Section 6.0-Packaging and Shipping Limited-Quantity Radioactive Samples

1.1 Objective

The objective of this SOP is to outline the requirements for the packaging and shipment of environmental samples. Additionally, Sections 2.0 through 6.0 outline requirements for the packaging and shipping of regulated environmental samples under the Department of Transportation (DOT) Hazardous Materials Regulations, the International Air Transportation Association (IATA), and International Civil Aviation Organization (ICAO) Dangerous Goods Regulations for shipment by air and applies only to domestic shipment (including data loggers and self-contained breathing apparatus (SCBAs) or bulk chemicals that are regulated under the DOT, IATA, and ICAO.

1.2 Background

1.2.1 Definitions

Environmental Sample- An aliquot of air, water, plant material, sediment, or oil that represents the contamination levels on a site. Samples of potential contaminants sources, like tanks, lagoons, or non aqueous phase liquids are normally not “environmental” for this purpose. This procedure applies only to environmental samples that contain less than reportable quantities for any foreseeable hazardous constituents according to DOT regulations promulgated in 49 CFR-Part 172.101 Appendix A.

Custody Seal- A custody seal is a narrow adhesive-backed seal that is applied to individual sample containers and/or the container (i.e., cooler) before offsite shipment. Custody seals are used to demonstrate that sample integrity has not been compromised during transportation from the field to analytical laboratory.

Inside Container- The container, normally made of glass or plastic, that actually contacts the shipped material. Its purpose is to keep the sample from mixing with the ambient environment.

Outside Container- The container, normally made of metal or plastic, that the transporter contacts. Its purpose is to protect the inside container.

Secondary Containment- The outside container provides secondary containment if the inside container breaks (i.e., plastic overpackaging if liquid sample is collected in glass.)

Excepted Quantity- Excepted quantities are limits to the mass or volume of a hazardous material in the inside and outside container below which DOT, IATA, or ICAO regulations do not apply. The excepted quantity limits are very low. Most regulated shipments will be made under limited quantity.

Limited Quantity- Limited quantity is the maximum amount of a hazardous material below which there are specific labeling or packaging exceptions.

Qualified Shipper- A qualified shipper is a person who has been adequately trained to perform the functions of shipping hazardous materials.

1.2.2 Discussion

Proper packaging and shipping is necessary to ensure the protection and the integrity of environmental samples shipped for analysis. These shipments are potentially subject to regulations published by DOT, IATA, or ICAO. Failure to abide by these rules places the risk of serious fines. The analytical holding for the samples must not be exceeded. The samples should be packed in time to be shipped for overnight delivery. Make arrangements with the laboratory before sending samples for weekend delivery.

1.2.3 Associated Procedures

- SOP 1-1, Sample Custody

1.3 Required Equipment

- Coolers with return address of the appropriate office
- Heavy-duty plastic garbage bags
- Plastic sip-type bags, small and large
- Clear tape
- Nylon reinforced strapping tape
- Duct tape
- Vermiculite (or equivalent nonflammable material that is inert and absorbent)
- Bubble wrap (optional)
- Ice
- Custody seals
- Completed chain-of-custody record or contact laboratory program (CLP) custody records, if applicable
- Completed bill of lading

- "This End Up" and directional arrow labels
- Check for any client-specific or laboratory requirements related to the use of absorbent packaging materials.

1.4 Packaging Environmental Samples

The following steps must be followed when packing sample bottles and jars for shipment:

1. Verify the samples undergoing shipment meet the definition of "environmental sample" and are not a hazardous material as defined by DOT. Professional judgment and/or consultation with qualified persons such as the appropriate health and safety coordinator or the health and safety manager should be observed.

2. Select a sturdy cooler in good repair. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler. Line the cooler with a large heavy-duty plastic bag.

3. Be sure that the caps on all bottles are tight (will not leak); check to see that labels and chain-of-custody records are completed properly (SOP 1-1, Sample Custody).

4. Place all bottles in separate and appropriately sized plastic zip-top bags and close the bags. Up to three VOA vials may be packed in one bag. Binding the vials together with a rubber band on the outside of the bag, or separating them so that they do not contact each other, will reduce the risk of breakage. Bottles may be wrapped in bubble wrap. Optionally, place three to six VOA vials in a quart metal can and then fill the can with vermiculite of equivalent. Note: Trip blanks must be included in coolers containing VOA samples.

5. Place 2 to 4 inches of vermiculite (or equivalent) into a cooler that has been lined with a garbage bag, and then place the bottles and cans in the bag with sufficient space to allow for the additional packing material between the bottles and cans. It is preferable to place glass sample bottles and jars into the cooler vertically. Glass containers are less likely to break when packed vertically rather than horizontally.

6. While placing sample containers into the cooler, conduct an inventory of the contents of the shipping cooler against the chain-of-custody record. The chain-of-custody with the cooler should reflect those samples within the cooler.

7. Put ice in large zip-top bags (double bagging the zip-tops is preferred) and properly seal. Place the ice bags on top of and/or between the samples. Several bags are required (dependent on outdoor temperature, staging

time, etc.) to maintain the cooler temperature at approximately 4° Celsius (C) if the analytical method requires cooling. Fill all remaining space between the bottles or cans with packing material. Securely fasten the top of the large garbage bag with fiber or duct tape.

8. Place the completed chain-of-custody record for the laboratory into a plastic zip-top bag, seal the bag, tape the bag to the inner side of the cooler lid and close the cooler.

9. The cooler lid shall be secured with nylon reinforced strapping tape by wrapping each end of the cooler a minimum of two times. Attach a completed chain-of-custody seal across the opening of the cooler on opposite sides. The custody seals should be affixed to the cooler with half of the seal on the strapping tape so that the cooler cannot be opened without breaking the seal. Complete two more wraps around with fiber tape and place clear tape over the custody seals.

10. The shipping container lid must be marked “THIS END UP” and arrow labels that indicate the proper upward position of the container should be affixed to the cooler. A label containing the name and address of the shipper shall be placed on the outside of the container. Labels used in the shipment of hazardous materials (such as Cargo Only Air Craft, Flammable Solids, etc.) are not permitted on the outside of containers used to transport environmental samples and shall not be used. The name and address of the laboratory shall be placed on the container, or when shipping by common courier, the bill of lading shall be completed and attached to the lid of the shipping container.

2.0 Packaging and Shipping Samples Preserved with Sodium Hydroxide

2.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 2-1
Excepted Quantities of Sodium Hydroxide Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
NaOH 30%	>12	0.08%	0	0.25	0.5	1	2

2.2 Responsibility

It is the responsibility of the qualified shipper to determine the amount of preservative in each sample so that accurate determination of quantities can be made.

2.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

- Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test
- Inner packings may consist of glass or plastic jars no larger than 1 pint
- Survey documentation (if shipping from DOE or radiological sites)
- Class 8 corrosive labels
- Orientation labels
- Consignor/consignee labels

2.4 Packaging Samples Preserved with Sodium Hydroxide

The following steps are to be followed when packaging NaOH limited-quantity samples shipments.

- All openings in sample containers will be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.

- All sample containers will properly labeled and secured with waterproof tape prior to sampling.

- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.
- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

3.0 Packaging and Shipping Samples Preserves with Hydrochloric Acid

3.1 Containers

The inner packaging container (and amount of preservative) that may be used for these shipments includes:

Table 3-1
Excepted Quantities of Hydrochloric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container		
	pH	Conc.	40ml	125 ml	250ml
HCl 2N	<1.96	0.04%	0 .2	0.5	1

3.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

3.3 Packaging Samples Preserved with Hydrochloric Acid

The following steps are to be followed when packaging limited-quantity sample shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container (40-ml VOA vials) in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

4.0 Packaging and Shipping Samples Preserved with Nitric Acid

4.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 4-1
Excepted Quantities of Nitric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
HNO_3 6N	<1.62	0.15%	0	2	4	5	8

4.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

4.3 Packaging Samples Preserved with Nitric Acid

The following steps are to be followed when packaging limited-quantity samples shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

5.0 Packaging and Shipping Samples Preserved with Sulfuric Acid

5.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 5-1
Excepted Quantities of Sulfuric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
H_2SO_4 37N	<1.15	0.35%	0.1	.25	0.5	1	2

5.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

5.3 Packaging Samples Preserved with Sulfuric Acid

The following steps are to be followed when packaging limited-quantity samples shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

6.0 Packaging and Shipping Limited-Quantity Radioactivity Samples

6.1 Containers

The inner packaging container that may be used for these shipments includes:

- Any size sample container

6.2 Description/Responsibilities

- The qualified shipper will determine that the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT.
- The qualified shipper will ship all samples that meet the Class 7 definition of radioactive materials and meet the activity requirements specified in Table 7 of 49 CFR 173.425, as Radioactive Materials in Limited Quantity. The qualified shipper will verify that all packages and their contents meet the requirements of 49 CFR 173.421, *Limited Quantities of Radioactive Materials.*
- The packaging used for shipping will meet the general requirements for packaging and packages specified in 49 CFR 173.24 and the general design requirements provided by 173.410. These standards state that a package must be capable of withstanding the effect of any acceleration, vibration, or resonance that may arise under normal condition of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole and without loosening or unintentionally releasing the nuts, bolts or other securing devices even after repeated use.
- If the shipment is from a DOE facility, radiological screenings will be completed on all samples taken. The qualified shipper will review the results of each screening (alpha, beta, and gamma speciation). Samples will not be shipped offsite until the radiological screening has been performed.
- The total activity for each package will not exceed the relevant limits listed in Table 7 of 49 CFR 173.425. The A_2 value of the material will be calculated based on all radionuclides found during previous investigations (if any) in the area from which the samples are derived. The A_2 values to be used will be the most restrictive of all potential radionuclides as listed in 49 CFR 173.435.
- The radiation level at any point on the external surface of the package bearing the sample(s) will not exceed 0.005 millisievert/hour (mSv/Hr); which is equivalent to 0.5 millirem/hour (mrem/Hr). These will be verified by dose and activity monitoring prior to shipment of the package.
- The removable radioactive surface contamination of the external surface of the package will not exceed the limits specified in 49 CFR 173.443(a).

- The qualified shipper will verify that the outside of the inner packaging is marked “Radioactive”.
- The qualified shipper will verify that the excepted packages prepared for shipment under the provisions of 49 CFR 173.421 have a notice enclosed, or shown on the outside of the package, that reads, **“This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910.”**

6.3 Additional Required Equipment

The following equipment is needed in addition to the required listed in Section 1.3.

- Survey documentation/radiation screening results (if shipping from DOE or radiological sites)
- Orientation labels
- Excepted quantities level
- Consignor/consignee

6.4 Packaging of Limited-Quantity Radioactive Samples

The following steps are to be followed when packaging limited-quantity sample shipment.

- The cooler is to be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.
- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector’s initials
  - Preservative

- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.
- Place the bubble-wrapped container into a zip-type bag, removing trapped air.

- Glass containers inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature (4^0 C).
- Seal the garbage bag by tying or taping.
- Place a label marked Radioactive on the outside of the sealed bag.
- Enclose a notice that includes the name of the consignor or consignee and the following statement: **"This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910."**
- Note that both DOT and IATA apply different limits to the quantity in the inside packing and in the outside packing
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody form.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler/package.
- Affix a completed Excepted Quantities label to the side of the cooler/package.
- Secure any marking and labels to the surface of the cooler with clear water proof tape to prevent accidental removal during shipment.

7.0 References

U.S. Environmental Protection Agency, *Sampler's Guide to the Contract Laboratory Program*, EPA/540/P-90/106, December 1990

U.S. Environmental Protection Agency, Region IV, *Standard Operating Procedures and Quality Assurance Manual*, February 1991.

U.S. Environmental Protection Agency Rule, 40 CFR 136

Dangerous Goods and Hazardous Materials Inspection Checklist For Shipping Limited-Quantity

Sample Packaging

Yes	No	N/A	
☐	☐	☐	The VOA vials are wrapped in bubble wrap and placed inside a zip-type bag.
☐	☐	☐	The VOA vials are placed into a polyethylene bottle, filled with vermiculite, and tightly sealed.
☐	☐	☐	The drain plug is taped inside and outside to ensure control of interior contents.
☐	☐	☐	The samples have been placed inside garbage bags with sufficient bags of ice to preserve samples at 4° C.
☐	☐	☐	The cooler weighs less than the 66-pounds limit for limited-quantity shipment.
☐	☐	☐	The garbage bag has been sealed with tape (or tied) to prevent movement during shipment.
☐	☐	☐	The chain-of-custody record has been secured to the interior of the cooler lid.
☐	☐	☐	The cooler lid and sides have been taped to ensure a seal.
☐	☐	☐	The custody seals have been placed on both the front and back hinges of the cooler, using waterproof tape.

Air Waybill Completion

Yes	No	N/A	
☐	☐	☐	The shipper's name, company, and address; the account number, date, internal billing reference number; and the telephone number have been included.
☐	☐	☐	The recipient's name and company along with a telephone number have been included.
☐	☐	☐	The number of packages and their weights have been filled out.
☐	☐	☐	The Name, Place and Date, Signature, and Emergency Telephone Number appears at the bottom of the FedEx Airbill.
☐	☐	☐	The Emergency Contact Information at the bottom of Airbill is truly someone who can respond any time of the day or night.

Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Sub Risk	Quantity	Packing Instruction	Authorization
Hydrochloric Acid Solution	8	UN1789	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.

Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Sub Risk	Quantity	Packing Instruction	Authorization
Nitric Acid Solution (with less than 20%)	8	UN2031	II		1 plastic box x 0.5 L	Y807	Ltd. Qty.
Sodium Hydroxide Solution	8	UN1824	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.
Sulfuric Acid Solution	8	UN2796	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.

Sample Cooler Labeling

Yes	No	N/A	
☐	☐	☐	The proper shipping name, UN number, and Ltd. Qty. appears on the shipping container
☐	☐	☐	The corresponding hazard labels are affixed on the shipping container; the labels are not obscured by tape.
☐	☐	☐	The name and address of the shipper and receiver appear on the top and side of the shipping container.
☐	☐	☐	The air waybill is attached to the top of the shipping container.
☐	☐	☐	Up arrows have been attached to opposite sides of the shipping container.
☐	☐	☐	Packaging tape does not obscure markings or labeling.

SOP 03

FIELD LOGBOOK CONTENT AND CONTROL

1.0 Objective

The objective of this standard operating procedure (SOP) is to set the criteria for content entry and form of field logbooks. Field logbooks are an essential tool to document field activities for historical and legal purposes, as well as to include in the contractor's project file.

2.0 Background

2.1 Definitions

Biota- The flora and Fauna of a region

Magnetic Declination Corrections – Compass adjustments to correct for the angle between magnetic north and geographical meridians.

2.2 Discussion

Information recorded in field logbooks includes field team names, observations, data, calculations, date/time, weather, and description of the data collection activity, methods, instruments, and results. Additionally, the logbook may contain deviations from plans and descriptions of wastes, biota, geologic material and site features including sketches, maps or drawings as appropriate.

3.0 Responsibilities

Field Team Leader – The field team leader (FTL) is responsible for ensuring that the format and content of data entries are in accordance with this procedure.

Site Personnel- All employees who make entries in field logbooks during onsite activities are required to read this procedure prior to engaging in this activity. The FTL will assign field logbooks to site personnel who will be responsible for their care and maintenance. Site personnel will return field logbooks to the records file at the end of the assignment.

4.0 Required Supplies

- Site-specific plans
- Field Notebook
- Indelible black or blue ink pen
- Ruler/Scale

5.0 Procedures

5.1 Preparation

In addition to this SOP, site personnel responsible for maintaining logbooks must be familiar with procedures applicable to the field activity being performed. These procedures should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation. These procedures should be located at the field office.

Field logbooks shall be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the logbook. Prior to use in the field, the following information shall be recorded on the cover of the logbook:

- Field logbook Project Number/Document control number
- Activity (if the logbook is to be activity-specific) and location
- Name of project contact and phone number(s)
- Start date
- In specific cases, special logbooks may be required (e.g. waterproof paper for stormwater monitoring etc.)

5.2 Operation

Requirements that must be followed when using a logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the logbook. If data collection forms are specified by an activity-specific plan, this information need not be duplicated in the logbook. However, any forms used to record site information must be referenced in the logbook.
- Do not start a new page until the current page is full or has been marked with a single diagonal line and initialed by the author so that additional entries cannot be made. Use both sides of each page.
- Do not erase or blot out any entry at any time. Indicate any deletion by a single line through the material to be deleted. Initial and date each deletion. Take care to not obliterate what was written previously.
- Do not remove any pages from the book.

Specific requirements for field logbook entries include:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial and date all changes (changes are to be crossed out with a single line, initialed, and dated).
- Multiple authors must sign out the logbook by inserting the following:
- Date and Time

- Name of individual making entry
- Names of field team and other persons onsite
- Description of activity being conducted including installation, site, or location (i.e., well, boring, sampling location number) if appropriate.
- Weather conditions (i.e. Temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
- Level of personal protection to be used
- Required calibration information
- Serial/tracking numbers on documentation (e.g. carrier air bills)

Entries into the field logbook shall be preceded with the time (written in 24 hour time format) of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being performed. All measurements made and samples collected must be recorded unless they are documented by automatic methods (E.G. data logger) or on a separate form required by an operating procedure. In these cases, the logbook must reference the automatic data record or form.

At each location where a sample is collected or an observation or measurement made, a detailed description of the location of the location is required. Use a compass (include a reference to magnetic declination corrections), scale, or nearby survey markers, as appropriate. A sketch of the location location may be warranted. All maps or sketches made in the logbook should have descriptions of the features shown and a direction indicator. It is preferred that maps and sketches be oriented so that north is toward the top of the page. Maps, sketches, figures, or data that will not fit on a logbook page should be referenced and attached to the logbook to prevent separation.

Other events and observations that should be recorded include:

- Changes in weather that impact field activities.
- Deviations from procedures outlined in any SOPs or governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personal protection equipment.
- Health and safety related issues.
- Emergencies.
- Site visitors.

5.3 Post-Operation

To guard against loss of data due to damage or disappearance of logbooks, completed pages shall be scanned and saved in the electronic project file at the earliest opportunity. For longer duration sampling events (weeks to months), this action is preferred at the end of each work week. Duplication of logbook documentation is crucial in maintaining official record of on-site technical work. In some cases, the contractor's clients may request logbook records of technical work

performed by the contractor. It is the contractor's responsibility to maintain official records of all contract work, not only for company files, but for client files. Other field records shall be scanned and saved regularly and as promptly as possible to the electronic project file.

At the conclusion of each activity or phase of site work, the individual responsible for the logbook will ensure that all entries have been appropriately signed and dated, and that corrections were made properly (single lines drawn through incorrect information, then initialed and dated). The completed logbook shall be submitted to the records file.

6.0 Restrictions/ Limitations

Field logbooks constitute the official record of onsite technical work, investigations, and data collection activities. Their use, control and ownership are restricted to activities pertaining to specific field operations carried out by personnel and their subcontractors. They are documents that may be used in court to indicate dates, personnel, procedures, and techniques employed during site activities. Entries made in these logbooks should be factual, clear, precise, and non-subjective. Field logbooks, and entries within, are not to be used for personal use.

SOP 4

FIELD SAMPLE NUMBERING

1.0 Purpose

This Standard Operating Procedure (SOP) establishes the guidelines and procedures for sample numbering. Sample numbering is required to identify, track, and trace samples from the time of collection until the time of disposal. Additional specific procedures and requirements are provided in the Tier II Uniform Federal Programs Quality Assurance Project Plan (UFP-QAPP).

2.0 Definitions/Materials

Decision Unit (DU) – DU is defined as the smallest volume of soil collected over an area for the purposes of decision-making

Sample – sample is material to be analyzed that is contained in single or multiple containers representing a unique sample identification number.

Sample Label – A sample label is an adhesive label placed on each sample containers to designate a sample identification number and other sampling information.

Sample Number or Sample Identification (Sample ID) – Sample ID is a unique alphanumeric identification assigned to each and all physical samples collected as part of any given project.

Sample Tag – A sample tag is attached with string to a sample container to designate a sample identification number and other sampling information. Tags may be used when it is not feasible to place adhesive labels on the container (e.g., in the case of small sampling tubes).

3.0 Responsibility

3.1 Field Team Lead

The Field Team Lead is responsible for ensuring that all sample collection and numbering activities are conducted and documented in accordance with this SOP and any other applicable procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control. The Field Team Lead is also responsible for the implementation of corrective action (i.e., retraining personnel and additional review of SOPs) if case of deviation from the approved procedure.

3.2 Project Chemist

The Project Chemist is responsible for issuing variances to sample labeling requirements and issuing nonconformance approvals if problems occur.

3.3 Field Staff

All staff are responsible for reporting deviations from this SOP to the Field Team Lead.

4.0 Required Supplies

- Chain-of-custody forms
- Sample labels
- Custody seals
- Clear tape

5.0 Procedures

This section contains the procedures for sample numbering and labeling. Sample numbering is required to provide a means by which samples can be identified, tracked, and traced from the time of collection until the time of disposal. The details within this SOP should be used in conjunction with the UFP-QAPP, which provides the following information**:**

- Sample collection objective
- Numbers, types, and locations of samples to be collected.
- Location identifiers (location IDs) for planned sample points
- Date and time of collection
- Sampler's initials
- Any additional sample numbering requirements or procedures beyond those covered in this SOP, as necessary.

6.0 Sample Numbering

- The sample numbers should be as simple and preferably as short as possible; however, they should also be compatible with the laboratory analytical tracking system and the data management system to be used for the project sample data.
- A unique sample number will be assigned in the field to each sample to be submitted for analysis.
- The sample numbers will be assigned sequentially (e.g. DU 1-ISM-01-1 through DU 1-ISM-01-10) as the samples are collected. Both primary (non-QC) and QC samples will be assigned sample numbers with the same prefix so that the laboratory will be unable to distinguish between the QC and non-QC samples.

- The sample number will be recorded, using indelible ink, directly on the sample label attached to each sample per SOPs 08 and 09.

- The sample number must also be recorded on the Field logbook, sample bag or jar, and Chain-of-Custody Form.

- It is recommended that one person (either the Project Chemist, Field Team Lead, or other designee) be responsible for issuing sample numbers to field sampling personnel and for soil samples, ensuring that the sample sequence numbers are applied to samples in the sequence in which they are collected.

- It is also recommended the Field Team Lead or designee be responsible for keeping a master sample log listing in the field logbook, including the sample numbers and a brief description of the samples collected.

7.0 Chain of Custody Procedure

This will be done in accordance with the procedure outlined in SOP 8. Samples are in custody if they are in the custodian's view, stored in a secure place with restricted access, or placed in a container secured with custody seals. Samples will not be outside of designated personnel's custody unless the samples have been transferred to a secure area (i.e., locked up and custody sealed) or transferred to the laboratory. If the samples cannot be placed in a secure area, a field team member will always physically remain with the samples (e.g., during breaks or mealtimes). A COC record will be signed by each person who has custody of the samples and will always accompany the samples. Copies of the COC form will be included in the laboratory and QA/QC Reports.

The COC will either be electronic or a hard copy with information on:

- Site
- Sample Identification completed using a seven-digit unique designation according to the following:
    - A three-character designation of the DU (i.e. DU1)
    - A two- or three-character designation for type of sample (i.e. ISM or SS [soil sample])
    - A two-character designation for primary, duplicate or QC sample (i.e. 01 for primary, 03 for duplicate, 05 for a source blank and 07 for an equipment blank.
    - A one-character designation for consecutive samples from the same location (i.e. 1 for the first sample within a DU)
    - Each character will be separated by a dash (i.e. DU 1-ISM-01-1).
- Date and Time of Sample Collection
- Sample Type
- Number of Samples
- Field Supervisor's Name and Team Members Responsible for Collection of the Listed Samples
- Number of Containers (Coolers) Shipped
- Requested Analyses for Each Sample
- Name, Date, Time, and Signature of the Relinquishing and Receiving Personnel (commercial shipment carriers not included)

7.1 Sample Labels and Tags

Unless the client directs otherwise, sample labels or tags will be used for all samples collected or accepted.

a. Complete on label or tag with the information required by the client for each sample container collected. A typical label or tag would be completed as follows:
   - Record the project code (i.e., project or task number).
   - Enter the station number (sample number) if applicable.
   - Record the date to indicate the month, day, and year of sample collection.
   - Enter the time (24-hour time format) of sample collection (3 pm is equivalent to 1500, whereas 3 am is equivalent to 0300).
   - Place a check to indicate composite of grab sample.
   - Record the station (sample) location.
   - Sign in the space provided.
   - Place a check next to 'yes" or "no" to indicate if a preservative was added.
   - Place a check under "Analyses" next to the parameters for which the sample is to be analyzed. If the desired analysis is not listed, write it in the empty slot. **Note**: Do not write in the box for "laboratory sample number."
   - Place or write additional relevant information under "Remarks."

b. Place adhesive labels directly on the sample containers. Place clear tape over the label to protect from moisture and to preserve the information on the label.

c. Double - check that the information recorded on the sample tag is consistent with the information recorded on the chain-of-custody. Sample labels should be checked in the field by at least two members of the sampling team.

SOP 09

LOW FLOW SAMPLING

1.0 INTRODUCTION

1.1 Overview

This Standard Operating Procedure (SOP) was prepared to provide instructions for groundwater sampling using the United States Environmental Protection Agency (USEPA) low-flow/minimal drawdown well purging protocol. Included in this SOP are field forms for sampling and meter calibration, instructions, and directions for documentation.

This SOP will be implemented in accordance with the following governing documents:

- Site Safety and Health Plan (SSHP), which identifies all physical, chemical, and biological hazards relevant to each field task and provides hazard mitigators to address these hazards;
- Sampling and Analysis Plan (SAP), which provides details for field sampling locations and procedures and which will be most frequently used by field staff on-site; and

1.2 Objective

The objective of low flow sampling techniques is to collect a representative groundwater sample from a monitoring well.

1.3 Equipment and Supplies

Pump and probe selection may differ depending on the well diameter, groundwater constituents, and depth to groundwater, but generally, sampling will require the following equipment:

- Peristaltic, bladder, submersible, or hydrolift pump capable of a flow rate between 50 and 500 mL/minute and appropriate power supply, including compressor/compressed gas (nitrogen or carbon dioxide) if needed. The pump type will principally depend on the depth to water and well diameter. Bladder or submersible pumps are preferred, peristaltic pumps are acceptable only for wells where the depth to water is less than or equal to 25 to 30 feet below ground surface (bgs), and hydrolift pumps are only recommended for wells that cannot be sampled using a bladder or peristaltic pump (wells deeper than 75 feet bgs).
- Water quality meter and flow-through cell (e.g., YSI, Horiba) for measuring pH, temperature, conductance (and/or specific conductance), dissolved oxygen (DO), and oxidation-reduction potential (ORP) of groundwater, and a turbidity meter.

- Calibration solutions for water quality meters, per manufacturer's requirements.
- Water level meter.
- Tubing, connections, and tools as appropriate; sufficient tubing to dedicate to each well.
- In-line filter apparatus (0.45-micron), if applicable.
- Graduated cylinder, measuring cup, or 1-liter bottle, and stopwatch.
- 5-gallon bucket and funnel for purge water.
- Field forms for meter calibration and groundwater sample collection (included in SOP) and log book.
- Personal Protective Equipment (PPE) (as specified in the SSHP).
- Photo-ionization device (PID), or other air monitoring equipment as specified in SSHP.
- Three stage decontamination station. The first two 5-gallon buckets (first and second stages) are filled with approximately two gallons of tap water. The first 5-gallon bucket (first stage) includes less than a teaspoon of Alconox or liquinox detergent. The third 5-gallon bucket (third stage) is filled with distilled water. Cleaning brushes are included in the first 5-gallon bucket to assist in scrubbing and removing potential contamination from sampling devices and or tools. The second and third stages of decontamination are used as rinses, following the decontamination wash in the first stage. Sampling devices are removed from the third stage, allowed adequate time to dry (ambient air) and reassembled for the next sampling location or storage. Decontamination supplies as specified in SAP.
- Sample containers and cooler.
- Clean plastic sheeting, paper towels, and miscellaneous supplies.
- pH paper (if applicable).
- Field test kits for ferrous iron, sulfide, and alkalinity (if applicable).

2.0 PROCEDURES

2.1 Pre-Mobilization Activities

- Obtain the construction, diameter, depth, material, screened interval, and map showing location for each monitoring well to be sampled.
- Obtain a listing of the parameters that will be measured in the field or laboratory as part of this sampling program including the required analytical method,

sample volume, and holding time for each parameter. The parameters that will be measured in the field are the low-flow stabilization parameters including temperature, pH, specific conductance, ORP, DO, and turbidity. These parameters will be recorded during low flow purging and immediately prior to collection of samples for laboratory analysis. In addition, certain geochemical parameters, such as ferrous iron, mayl be measured in the field through test kits. Remaining parameters will be measured in the laboratory.

- Verify that all equipment on order is being shipped to the appropriate address.

2.2 Pre-Sampling Procedures

Several steps are required before sampling any of the wells. These steps ensure that instruments are functioning and properly calibrated and that the necessary equipment has been supplied for efficient and accurate sampling.

Inventory

Verify that the correct equipment has been procured, cleaned, calibrated, and ready for the sampling event. Inventory sample containers to verify that the laboratory has provided the correct number of containers of the proper size and containing the correct preservative if required. To the extent possible, pre-label/tag and bundle sample containers for each well to avoid confusion during sample collection.

Verify that the appropriate PPE and ancillary supplies (e.g., paper towels, decontamination solution) have been received . The appropriate protective equipment, as specified in the SSHP, will be reviewed during a morning tailgate meeting. Contact the field manager or project manager immediately if there are discrepancies.

2.2.2 Calibration

Calibrate the sampling equipment (water quality meter, PID, etc.) consistent with the manufacturer's specifications before sampling and at the start of each field day. Record the calibration data in the field logbook, or on a preprinted field calibration form. A check of the calibration shall be performed at least once more during the field day. Instruments will be sent back to the manufacturer or rental company for recalibrated as necessary (e.g., when calibration checks indicate incorrect operation) to ensure accurate measurements, and all checks and recalibrations will be recorded in the field logbook or on field calibration forms. Calibration will also be checked if any readings during sampling are suspect.

2.2.3 Well Inspection

Inspect the well for the presence of lock and cap, surface seal integrity, obstructions, evidence of tampering, debris, or surface water collecting in flush mounts. Note any irregularities on the groundwater sampling field form and logbook

2.3 Well Purging and Sampling

Sampling is performed in teams according to the SSHP buddy system protocol. Sampling is performed using a five-step procedure that will be followed upon arrival at each well:

1. set-up;
2. purging;
3. measurement of field parameters and field testing;
4. sampling; and
5. clean-up and decontamination.

Detailed procedures for performing each of these steps are provided in the following subsections.

2.3.1 Set-up

Set-up of equipment at any project site should first include the decontamination station and unpacking tools and sampling equipment / supplies. Sampling equipment shall be decontaminated prior to use. All wells shall be visually inspected to include the exterior (well monument) and the interior (well vault, and well casing). The visual assessment of each well monument is necessary to determine if it allows positive drainage of stormwater or runoff water (drainage away from the well monument). Standing water around a well monument or even inside the well vault indicates positive drainage is not occurring. The well monument shall be inspected for visual exterior damage (cracked concrete well apron, damaged well lid, missing well lid bolts). The interior of the well monument shall also be visually inspected to include an assessment of the well vault, well cap, and the top of the well casing rise. Air monitoring using a PID will be performed per SSHP requirements while opening well. Following well inspection, the water level shall be recorded to the nearest 0.01 foot, including the total depth of the monitoring well. Water level and total depth data shall be recorded in the field log book.necessary equipment for purging, sampling, and storage will be brought to the well before the well is opened. If sampling equipment is not able to be placed on a contaminant free surface, it will be placed on a clean plastic sheet near the well. General parameters describing the well and field condition (e.g., well identification, depth, weather, date, and time) will be documented in the field logbook and on a groundwater sampling form. The tubing, field probe, and reservoir for purged water are then set up.

2.3.2 Purging (Low Flow Protocol)

Wells are purged using the low flow/minimum drawdown protocol as described by Puls and Barcelona (1996) and summarized below. The general procedural requirements for low-flow purging are listed below.

- Lower the pump slowly down the well to minimize disturbance of the water column, positioning the well intake at the middle of the well screen.
- Minimize disturbance of the water column in the well by initiating pumping at a low rate (see below).
- Begin pumping at a steady rate of 100 mL/min and measure the depth to water frequently (e.g., every minute for the first few minutes) to ensure that less than 0.1 ft of drawdown occurs. The pumping rate may be increased if drawdown is less than 0.1 ft, but the pumping rate will not exceed 500 mL/min, and drawdown may not exceed 0.3 ft. In some silty and/or clayey formations, drawdown may exceed 0.1 ft when pumping at 100 mL/min. If this occurs, refer to the sections on *Variations from Low Flow Protocol* for alternatives to the low flow/minimum drawdown protocol.
- Field parameters and depth to water will be recorded on a groundwater sampling form a minimum of every three to five minutes while purging. Purging will continue until pH, temperature, specific conductance, ORP, DO, and turbidity stabilize (three consecutive readings), which is defined as follows:
    - ±0.1 units for pH;
    - ±3% for specific conductance;
    - ±10 mV for ORP;
    - ±10% for temperature;
    - ±10% for turbidity; and
    - ±10% for DO.

  DO and turbidity tend to stabilize last and are better measures of sufficient purging. Drawdown should be minimized during purging and/or sampling, not exceeding 0.3 ft, if possible.
- In the case that the above criteria for stabilization are not met before three well volumes have been pumped, then a maximum of five well volumes will be pumped before samples are taken. Also, if stabilization has not occurred after two hours of purging regardless of well volume status, samples will be collected at this point.

2.3.3 Variations from Low Flow Protocol

Wells in low-yield formations such as poorly fractured bedrock and silt or clay soils may not yield sufficient water for purging (e.g., 100 mL/min) without more than 0.1 ft of drawdown. In these cases, a modified low-flow method will be used. Currently, there is no published protocol for sampling low-recharge wells. Two modifications described

below have been endorsed at one site by USUSEPA for sampling and purging wells that yield less than 100 mL/min at a drawdown of 0.1 ft.

Alternative Method 1: Less than half the casing volume is located above the well screen

Purge the well with the pump intake located at the midpoint of the well screen by constant pumping at a rate no greater than 500 mL/min until the water level reaches the top of the well screen. Measure and record the field parameters and water depth at a minimum of five-minute intervals or at the end of every purge cycle, although it may be difficult to obtain stable measurements of certain parameters (i.e., DO, ORP, turbidity). Cease pumping and allow the water level to recover until the standing water column in the well (length from water level to bottom of well) equilibrates to at least 90% of the static water column. Repeat the purging and cessation cycle until a minimum of one casing volume is removed from the well. The well will then be allowed to recover sufficient volume to collect the required groundwater sample from the midpoint of the screened interval, within 24 hours of the last purging event.

Alternative Method 2: More than half the casing volume is located above the well screen

The well will be purged with the pump intake located at midpoint of the well screen at a rate no greater than 500 mL/min until the water level reaches the top of the well screen. This will remove at least one-half of a casing volume of water from the well. The well is then allowed eight hours to recover, after which time a volume of water equal to the casing volume of the screened interval will be removed, removing approximately a full casing volume during the two purging events. Directly following the second purging event, the required groundwater sample is to be collected from the midpoint of the screened interval.

Other Modifications to Low Flow Sampling

Other modifications of the low-flow protocol may be required. Low-recharge wells screened across the water table are not amenable to either of the methods described above. It may not be practical to sample extremely low recharge wells using any of the cited modifications, in which case, it will be necessary to evacuate all casing water and re-sample as soon as sufficient recharge has entered the well to provide a sample. Data from such wells will be qualified to indicate the potential for sample bias.

2.3.4 Field Measurements

Field parameter measurements will be recorded following parameter stabilization (purging) and before sampling. The pumping rate and sampler intake location in the well are not to be adjusted after purging. The field parameters measured are pH, temperature, specific conductance, DO, ORP, and turbidity.

2.3.5 Sampling

Samples will be collected after field parameters have stabilized and measurements recorded on the groundwater sampling form. The pump rate and sample intake location will not be adjusted between purging and sampling. The water quality meter will be disconnected from the influent line, while the purge water will be containerized. Samples are to be obtained from the influent line (prior) to the flow-through cell (i.e., field parameters cannot be measured during sampling). The following sampling strategy is to be followed at each location in its entirety prior to beginning a new location.

Sampling Methods by Analytical Group

Sample containers are to be filled in the order listed below and on the field data sheet using the following protocols. Note that many sample containers contain preservatives; hence, it is necessary to fill each container carefully enough to avoid or minimize overfilling, which may dilute the preservative to unacceptable levels. For each analysis, one of the corresponding containers will be tested with pH paper to confirm that the pH meets the corresponding limits stated in this SOP.

1. Volatile organic compound (VOC) samples will be collected first. Sample containers are to be completely filled so that a meniscus forms over the opening of the container. The container lid will be moistened with groundwater and screwed to the container body. The container is then turned upside down and inspected for air bubbles. If air bubbles exist in the container, then it is "topped off" to eliminate bubbles. This procedure is repeated until there are no entrapped bubbles in the container. Filled samples are stored at 4°C (±2°C).
2. Geochemistry-related parameters are to be sampled in the following order and with the following procedure:

    a) Alkalinity, ferrous iron, and sulfide measurements will be collected in the field per the field kit manufacturer's instructions.

    b) Major anions (sulfate, orthophosphate) – water will be dispensed into two 500 mL plastic bottles, sealed and stored at 4°C (±2°C).

    c) Total Organic Carbon (TOC) – water will be dispensed into a 125 mL amber glass bottle with H_3PO_4 as a preservative to achieve a pH below 2, sealed, and stored at 4°C (±2°C).
3. After all of the geochemistry-related parameters are collected, the following samples are collected:

a) Semi-volatile organic compound (SVOC) – water will be dispensed into two 1,000 mL amber glass bottles without a preservative, sealed, and stored at 4°C (±2°C).

b) Metals – groundwater will be split into two portions; one filtered sample and one unfiltered sample. The filtered sample (for dissolved metals analysis) will be field-filtered using a clean, disposable, 0.45-μm filter attached in-line to the sample tubing. Filtered water will be dispensed into a 500 mL wide-mouth plastic bottle with HNO_3 as a preservative to achieve a pH below 2, sealed and stored at 4°C (± 2°C). Unfiltered water (for total metals analysis) will be dispensed directly in to a 500 mL wide mouth plastic bottle with HNO_3 as a preservative to achieve a pH below 2, sealed, and stored at 4°C (± 2°C).

c) Cyanide – water will be dispensed into one 1-L plastic bottle, preserved with NaOH to a pH of > 12, sealed, and stored at 4°C (± 2°C).

2.3.6 Observations During Sampling

Field sampling staff will identify and log any observations that may be considered unusual into a field notebook or on the groundwater sampling field form for each well. These observations include, but are not limited to: excessive bubbling within the tubing or in the sample containers as they are filled; odors such as sulfide; excessive turbidity, solids, or formation of precipitates in the samples; color changes in the water; and unusual sounds made by the equipment. In addition, sampling personnel will note the condition of the well upon arrival and inspection. If the well casing is damaged and there are anomalies in the calculated water level at the well, then the casing damage may indicate compromised sample quality.

2.3.7 Storage and Shipping

All sample containers will be immediately placed in an iced (preferably double-bagged wet ice packs) cooler to remain at 4°C (±2°C) prior to and during shipment to the laboratory. The sample containers will remainstored in a cooler until further processing. Refer to the SOP Nos. 1, and 2 for sample shipping.

2.4 Documentation

Field documentation includes completed calibration records, groundwater sampling field forms, and other field notes deemed relevant. It is essential that field data sheets be filled out completely and legibly at each location, and that entries are consistent for each location and among different personnel. The following information will be recorded:

- job, site, date, and sampler;
- well identification and description;

- depth to water;
- casing volume calculation;
- depth of pump intake during purging and sampling;
- equipment used (field probes, tubing, model and serial numbers);
- purge rate, field parameters (temperature, conductivity, DO, ORP, pH, and turbidity) and depth to water recorded every 5 minutes;
- sampling parameters;
- stabilized field parameters;
- identification, time, container types, preservatives, and analytical methods for samples; and
- space for comments.

BACKGROUND ON LOW-FLOW/MINIMAL DRAWDOWN PURGING

Monitoring Well Sampling

The objective of groundwater sampling is to obtain a sample that is representative of groundwater quality under ambient flow conditions. To achieve this objective, a representative groundwater sample should contain: (i) the average concentration of all chemical constituents present in the target aquifer volume; (ii) constituents in the same phase and chemical speciation as present in-situ; and (iii) only the chemical constituents that are mobile under ambient groundwater flow conditions. The purpose of this section is to describe sampling practices that are most appropriate for investigations and to discuss key issues relevant to sampling. This discussion relies in part on sampling guidance developed by the USEPA.

Traditional methods of groundwater sampling call for purging three to five casing volumes of water from a well prior to sampling (Robbins and Martin-Hayden 1991, Barcelona *et al.* 1994, Wilson *et al.* 1995). These methods are no longer recommended by USEPA because they can induce bias through sample disturbance and particle mobilization, and produce larger volumes of purge water that increase exposure potential and disposal costs. Currently, USEPA recommends the low flow protocol for obtaining groundwater samples, although new sampling methods such as diffusion samplers are gaining regulatory acceptance in some situations. The low flow protocol and modifications to the low flow protocol that may be needed under some conditions are discussed in the following sections.

Note that although this document recommends low flow purging as the most widely accepted and reliable sampling method, modifications of the low flow protocol or other sampling protocols may be applicable in certain circumstances.

Low Flow Purging

The purpose of low flow purging is to draw sufficient water into the casing from the formation to produce a representative sample without generating excessive groundwater velocities outside the casing, which can bias the sample. Properly implemented in an appropriately constructed monitoring well, low flow purging induces lateral flow from the formation directly through the well screen and into the sampler intake. Several measurements that are often important for investigation and are particularly sensitive to sampling bias caused by high flow purging include concentrations of dissolved gasses (O_2, CO_2, methane, ethane) total metals, and ORP. An additional advantage of low flow purging is that mixing between water entering the casing and stagnant water existing in the casing is minimized, thus achieving stabilization of the purging parameters described below with less extracted volume than conventional purging.

Low flow purging uses the same stabilization criteria as conventional purging (i.e., stable temperature, DO, conductivity, E_h, pH, and turbidity), but requires careful flow regulation (typically at a rate of 0.1 to 0.5 L/min) to limit drawdown to the extent practical (less than 0.1 ft is the goal). Since low flow purging requires steady removal of water with minimal disturbance, grab samplers (e.g., bailers) cannot be used with the low flow protocol and are not recommended for either purging or sampling. According to Puls and Barcelona (1996), a representative sample can be collected when three successive measurements (taken at 5 minute intervals) are within ±0.1 units for pH, ±3% for conductivity, ±10 mV for E_h, and ±10% for turbidity and DO. The low flow sampling protocol provides for accurate measurement of in-situ values of these parameters (with the possible exception of temperature), which are important geochemical data for characterization. pH and temperature measurements tend to stabilize first, and are not particularly sensitive measures of complete purging, whereas DO and turbidity will stabilize last and are better measures of sufficient purging.

Puls and Barcelona (1996) have outlined the procedural requirements of low-flow purging as follows:

- The sampling device should be placed in the middle of the well screen to prevent the entrainment of solids from the bottom of the well into the sample (similar positioning for subsequent sampling rounds is critical for comparability of data).
- Minimize disturbance of the water column in the well by installing sampling equipment carefully or using equipment dedicated to each well, and initiating pumping at a low rate.
- Employ steady pumping at a rate that maintains less than 0.1 ft of drawdown. In most formations, this will correspond to a flow rate of 0.1 to 0.5 L/min, but may be less than 0.1 L/min in silts and clays or greater than 1 L/min in coarse sands and gravels or from large diameter wells. Sevee *et al.* (2000) provides design equations that can be used for estimating the pumping rate that yields 0.1 ft of drawdown, given well size and aquifer hydraulic conductivity.
- Purging should continue until pH, temperature, conductivity, E_h, DO, and turbidity stabilize. These measurements should be made in a sealed, flow-through cell. Of these parameters, turbidity is the best parameter for measuring sufficient purging. Satisfactory purging may require removal of more than one casing-volume of water, but typically requires less than three casing volumes.
- A dedicated, pre-installed pump or tubing is recommended to minimize the time required to sample each well. Use of dedicated pumps also prevents cross contamination of wells that can result from incomplete decontamination and causes less mixing of casing water prior to purging. The cost-effectiveness of

using dedicated pumps should be assessed based on site-specific sampling requirements.

Samples should be obtained from a sampling port upstream of the flow-through cell after parameter stabilization is achieved. Samples may be field-filtered if DQOs require measurement of dissolved versus mobile chemicals. Filtering should not be used to compensate for poor sampling technique, although in some cases the generation of turbidity artifacts may be unavoidable (e.g., fine-grained formation, poorly installed wells). When filtering is needed for either reason, in-line cartridge filters are recommended because they reduce handling and exposure of the sample to the atmosphere. If maintaining accurate particle-size cutoffs is a concern in filtering, a cascade system should be used (i.e., 1-micron pre-filter, followed by filtration through 0.45-micron or other smaller size filter).

In summary, the low flow protocol is preferred because it:

- typically minimizes the volume of purge water for disposal;
- provides most accurate measurements of volatile constituents;
- ensures collection of samples representative of in-situ conditions;
- collects samples containing only the mobile fraction of particulates; and
- is less vulnerable to inconsistencies among sampling staff over time.

Low flow sampling also has several disadvantages that must be kept in mind when planning sampling programs:

- higher initial capital costs, particularly if a pump is dedicated for each monitoring well;
- more time is often required to obtain a sample, which can increase total cost;
- more sophisticated equipment is used which requires more training; and
- more equipment needs to be transported to the field (e.g., conventional purging requires only a bailer whereas low-flow purging requires a pump, air cylinder, battery, or other power source).

Careful consideration of the appropriate sampling practice is critical to investigation. Traditional sampling techniques can provide inaccurate, misleading, or incomplete information relative to many aspects of geochemistry relevant for assessment. The importance of low flow sampling at sites is emphasized by Woodward (2000) who presents a case study that illustrates that many years of traditional sampling failed to support an argument that was later demonstrated relatively easily once low flow

sampling was used. In this case, traditional sampling methods indicated aerobic conditions not conducive to the degradation of the contaminants. Low-flow sampling techniques revealed that in-situ conditions were in fact anaerobic.

Modified Low Flow Protocol (low recharge wells)

Wells in low yield formations such as bedrock and clay may not be conducive to low flow purging and sampling. In these cases, pumping even at low rates may cause more than 0.1-ft of drawdown in the well or evacuate the well casing altogether. Note, however, that in these cases traditional purging is also inadequate, and it is even more important to remain cognizant of and strive to implement the goals of low flow sampling.

The practical lower limit on purge rate is a function of the casing volume, logistical constraints (time, available equipment, accessibility of the monitoring well), the required sample volume for analysis, and the tendency for sample quality to be altered as it passes through the sampling equipment. At very low pumping rates, the volume of the flow through cell must be decreased, and sample tubing length, thickness, and material may become critical. Barcelona *et al.* (1985) provide guidelines for tubing length, diameter, and thickness to minimize gas diffusion across tubing walls.

If, after consideration of these factors, it is determined that the low flow protocol is impractical, a modified low flow method should be used. Currently, there is no established protocol for sampling low recharge wells. The USEPA low flow protocol has provided guidance for low flow sampling in low permeability units and several investigators have addressed the issue of bias in VOC measurements resulting from purging of low recharge rate wells. The low flow guidance and the findings of these studies are consistent with the following modifications to the low flow protocol. These modifications have recently been endorsed by the USEPA for sampling and purging of wells that yield less than 100 mL/min at a drawdown of 0.1 m. During implementation of these methods, constant pumping with a peristaltic or bladder pump is recommended and field parameters should be measured, although it may be difficult to obtain stable measurements of certain parameters (i.e., DO, ORP, turbidity).

<u>Method 1</u>

The well is purged from the midpoint of the well screen at a rate no greater than 500 mL/min until the water level reaches the middle of the well screen. Pumping is ceased and the water level in the well is allowed to recover to static conditions. The well is purged a second time at a rate no greater than 500 mL/min until the water level reaches the middle of the well screen at which time pumping is ceased, this is repeated until a minimum of one casing volume is removed from the well. The well is allowed to

recover sufficiently to collect the required groundwater sample from the midpoint of the screened interval, within 24 hours of the last purging event.

Method 2

This method is suggested for wells that have more than half of their casing volume of water located above the well screen. The well is purged from the middle of the well screen at a rate no greater than 500 mL/min until the water level reaches the middle of the well screen. This removes at least one-half of a casing volume of water from the well. The well is then allowed eight hours to recover, after which time a volume of water equal to the casing volume of the screened interval is removed, essentially resulting in the removal of a full casing volume during the two purging events. Directly following the second purging event, the required groundwater sample is collected from the midpoint of the screened interval. If a modified low-flow protocol is required at a site, the choice of which protocol to implement should be made based on site conditions and regulatory preferences.

Other Modifications

Other modifications of the low-flow protocol may be deemed appropriate on a site-specific basis. Large diameter wells, for example, may require exceedingly long purge times at typical low-flow rates. Methods employed to sample such wells in a cost-effective manner should consider the potential to mobilize particulates, expose the sample to the atmosphere, obtain accurate field parameter measurements, and minimize waste.

References

Barcelona, M.J., Helfrich, J.A. and Garske, E.E. 1985. Sampling Tubing Effects on Groundwater Samples, *Analytical Chemistry* 57(2).

Barcelona, M.J., Wehrmann, H.A. and Varijen, M.D. 1994. Reproducible Well Purging Procedures and VOC Stabilization Criteria for Ground-Water Sampling. *Ground Water* 32(1): 12-22.

Puls, R.W. and Barcelona, M.J. 1996. Low-flow (minimal drawdown) Ground-Water Sampling Procedures. USEPA/540/S-95/504, ORD, Robert S. Kerr Environmental Research Center, Ada, OK.

Robbins and Martin-Hayden. 1991. Mass Balance Evaluation of Monitoring Well Purging. *Journal of Cont. Hydro.* 8: 203-224.

Sevee, J, White, C. and Maher, D., 2000. An Analysis of Low-Flow Ground Water Sampling Methodology, *Ground Water Monitoring and Remediation*. 20(2): 87-93.

Wilson, J.T. and Wilson, B.H. 1985. Biotransformation of Trichloroethylene in Soil. *Appl. Environ. Microbiol.* 49: 242-243.

Woodward, D. 2000. Low-Flow Purging/Sampling: Vital Link in Support of Natural Attenuation. *Proc. Remediation of Chlorinated and Recalcitrant Compounds: Vol. C2-1*.

Wickramanayake G., Gavaskar, A. and Kelly, M. (eds.), Battelle, Monterey, CA, May 22-25: 401-407.

SOP 10

DECONTAMINATION OF FIELD EQUIPMENT

1.0 Objective

The objective of this standard operating procedure (SOP) is to describe the general procedures required of the contractors employees for decontamination of field equipment at non-radioactive sites. This SOP serves as a guide and is applicable at most contaminated sites: however, it should be noted that site-specific conditions (i.e. type of contamination, type of media sampled) and the governing agency (i.e. United States Environmental Protection Agency [USEPA], Arizona Department of Environmental Quality [ADEQ], or Department of Energy [DOE]) may require modifications to the decontamination procedures provided in this SOP.

2.0 Background

2.1 Definitions

Analyte- Free Water- Tap water that has been treated so that the water contains no detectable heavy metals or other inorganic compounds. Analyte-free water should be stored only in clean glass, stainless steel, or plastic containers that can be closed when not in use.

Clean– Free of visible contamination and when decontamination has been completed in accordance with this SOP.

Cross Contamination- The transfer of contaminants through equipment or personnel from the contamination source to less contaminated or non-contaminated samples or areas.

Decontamination- The process of rinsing or otherwise cleaning the surfaces of equipment to rid them of contaminants and to minimize the potential for cross contamination of samples or exposure of personnel.

Organic-Free/Analyte-Free Water – Tap water that has been treated so that the water meets the analyte-free water criteria and contains no detectable organic compounds. Organic-free/analyte-free water should be stored only in clean glass, Teflon, or stainless steel containers that can be closed when not in use.

Potable Water- Tap water may be obtained from any municipal system. Chemical analysis of the water source may be required before it is used.

Soap – Low-sudsing, non-phosphate detergent such as Liquinox ™ and Alconox.

2.2 Discussion

Decontamination of field equipment is necessary to ensure acceptable quality of samples by preventing cross contamination. Further, decontamination reduces health hazards and prevents the spread of contaminants offsite.

3.0 Responsibilities

Field Team Leader – The field team leader (FTL) ensures that the field personnel are trained in the performance of this procedure and that decontamination is conducted in accordance with this procedure. The FTL may also be required to collect an document rinsate samples to provide quantitative verification that these procedures have been correctly implemented.

4.0 Required Supplies

- Stiff-bristle scrub brushes
- Plastic buckets, lids and troughs
- Soap, Liquinox ™
- Nalgene or Teflon sprayers or wash bottles or 2 to 5 gallon, manual-pump sprayer (pump sprayer material must be compatible with the solution used)
- Plastic sheeting
- Disposable wipes, rags, or paper towels
- Potable water
- Analyte-free water
- Organic-free/analyte free water
- Gloves, safety glasses and other protective clothing as specified in the site-specific health and safety plan
- High-pressure pump with soap dispenser or steam-spray unit (for large equipment only)
- Tools for equipment assembly and disassembly (as required)

5.0 Procedures

All reusable equipment (non-dedicated) used to collect handle, or measure samples will be decontaminated before coming into contact with any sample. Decontamination of equipment will occur either at a central decontamination station or at portable decontamination stations set up at the sampling location, drill site, or monitoring well location. The centrally located decontamination station will include an appropriately sized bermed and lined area on which equipment decontamination will occur and shall be equipped with a collection system and storage vessels. In certain circumstances, berming is not required when small quantities of water are being generated and for some short duration field activities. Equipment should be transported to the decontamination station in a manner to prevent cross-contamination of equipment and/or area. Precautions taken may include enclosing augers or rods in plastic wrap while being transported on a flatbed truck.

The decontamination area will be constructed so that contaminated water is either collected directly into appropriate containers (5-gallon buckets or steel wash tubs) or within the berms of the decontamination area that then drains into a collection system. Water from the collection system will be transferred into 55 gallon drums or portable tanks for storage. Typically, decontamination rinse water will be staged until sampling results or waste characterization results are

obtained, evaluated and the proper disposal of the waste is determined. The exact procedure for decontamination waste disposal should be discussed in the project specific Work Plan or Sampling and Analysis Plan (SAP).

All items that will come into contact with potentially contaminated media will be decontaminated before use and between sampling and/or drilling locations. If decontaminated items are not immediately used, they will be covered either with clean plastic or aluminum foil depending on the size of the item. All decontamination procedures for the equipment being used are as follows.

General Guidelines

- Potable, analyte-free, and organic free/analyte free water should be free of all contaminants of concern. Following the field plan, analytical data from the water source may be required.

- Decontaminated equipment will be allowed to air dry before being used.

- Documentation for all cleaning will be recorded in the logbook.

- Gloves, boots, safety glasses, and any other personnel protective clothing and equipment will be used as specified in the site-specific health and safety plan.

5.1 Heavy Equipment Decontamination

Heavy equipment includes drilling rigs and backhoes. Follow these steps when decontaminating this equipment:

- Establish a bermed decontamination area that is large enough to fully contain the equipment to be cleaned. If available, an existing wash pad or appropriate paved and bermed area may be used; otherwise, use one or more layers of heavy plastic sheeting to cover the ground surface and berms. All decontamination pads should be upwind of the area under investigation.

- With the rig/equipment in place, spray areas exposed to contaminated material (soils) using a hot water high-pressure sprayer. Be sure to spray down all surfaces, including the undercarriage.

- Use brushes, soap, and potable water to remove dirt whenever necessary.

- Remove equipment from the decontamination pad and allow it to air dry before returning it to the work site.

- Record the equipment type, date, and time and method decontamination in the appropriate logbook.

- After decontamination activities are completed, collect all contaminated wastewater, plastic sheeting, and disposable gloves, boots, and clothing in

separate containers or receptacles. All receptacles containing contaminated items must be properly labeled for disposal as detailed in the Work Plan or SAP. Liquids and solids must be drummed separately.

5.2 Downhole Equipment Decontamination

Downhole equipment includes hollow-stem augers. Drill pipes, rods, stems, etc. Follow these steps when decontaminating this equipment:

- Set up a centralized decontamination area, if possible. This area should be set up to collect contaminated rinse waters and to minimize the spread of airborne spray.

- Set up a “clean” area upwind of the decontamination area to receive cleaned equipment for air-drying. At a minimum clean plastic sheeting must be used to cover the ground, tables, or other surfaces on which decontaminated equipment is to be placed. All decontamination pads should be upwind of any areas under investigation.

5.3 Sampling Equipment Decontamination

- Set up a decontamination line on plastic sheeting. The decontamination line should progress from “dirty” to “clean”. A clean area shall be established upwind of the decontamination wash/rinse activities to dry the equipment. At a minimum, clean plastic sheeting must be used to cover the ground, table, or other surfaces that the decontaminated equipment is placed for drying.

- Disassemble any items that may trap contaminants internally. Do not reassemble the items until decontamination and air drying are complete.

- Wash the items with potable water and soap using a stiff brush as necessary to remove particulate matter and surface films. The items may be steam cleaned using soap and hot water as an alternative to brushing. Note that polyvinyl chloride or plastic items should not be steam cleaned. Items that have come into contact with concentrated and/or oily contaminants may need to be rinsed with a solvent such as hexane and allowed to air dry prior to the washing step.

- Thoroughly rinse the items with potable water.

- If sampling for metals, thoroughly rinse the items with an acid solution (e.g., 10 percent nitric acid) followed by a rinse using analyte-free water. If sampling for organic compounds, thoroughly rinse the items with solvent (e.g., isopropanol) followed by a rinse using analyte-free water. The specific chemicals used for the acid rinse and solvent rinse phases should be specified in the work plan. The acid rinsate and solvent rinsate must each be containerized separately. Acids and solvents are potentially hazardous materials and care must be exercised when using these chemicals to prevent adverse health affects (e.g., skin burns, irritation to the eyes and respiratory

system, etc.). Appropriate personal protective equipment must be worn when using these chemicals. These chemicals (including spent rinsate) must be managed and stored appropriately. Special measures such as proper labels, paperwork, notification, etc. may be required when transporting of shipping these chemicals.

- Rinse the items thoroughly using organic-free/analyte-free water.

- Allow the items to air dry completely.

- If large quantities of used decontamination solutions will be generated, each type of waste should be contained in separate containers.

- Unless otherwise required, plastic sheeting and disposable protective clothing may be treated as solid, nonhazardous waste.

- Waste liquids should be sampled, analyzed for contaminants of concern in accordance with disposal regulations, and disposed of accordingly.

6.0 Restrictions/ Limitations

Nitric acid and polar solvent rinses are necessary only when sampling for metals or organics respectively. These steps should not be used, unless required, because of the potential for acid burns and ignitability hazards.

If the field equipment is not thoroughly rinsed and allowed to completely air dry before use, volatile organic residue, which interferes with the analysis, may be detected in the samples. The occurrence of residual organic solvents is often dependent on the time of year sampling is conducted. In the summer, volatilization is rapid, and in the winter, volatilization is slow. Check with your USEPA region, state, and client for approved decontamination solvents.

7.0 References

American Society for Testing and Materials. 2002. Practice for Decontamination of Field Equipment at Nonradioactive Waste Sites, ASTM D5088-02. January 10.

Department of Energy. Hazardous Waste Remedial Actions Program. 1996. Standard Operating Procedures for Site Characterization, DOE/HWP-100/r1. September.

Exhibit D-2

Soil Monitoring Plan

DRAFT

Sampling and Analysis Plan

Soil Monitoring
Munitions Treatment Range
Marine Corps Air Station
Yuma, Arizona

January 2025

Prepared for:

United States Department of the Navy
Naval Facilities Engineering Systems Command Southwest
750 Pacific Highway
San Diego, CA 92132

Prepared by:

Liberty JV
1851 W. 24th Street
Yuma, AZ 85364-6104

Prepared under:

Contract N44255-20D-5006, Task Order No. N6247322F4675

Plan Prepared By:	Eric Gardner, Liberty JV PM	2/28/25 Date
Plan Approved By:	Jesse MacNeill, Liberty JV QA Coordinator	2/28/25 Date
Plan Approved By:	Mark Galate, MCAS Yuma	2/27/2025 Date

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Acronyms and Abbreviations

˚C ..... degrees Celsius
µg/kg ..... micrograms per kilogram
mg/kg ..... milligrams per kilogram
mL/min ..... milliliters per minute

ADEQ ..... Arizona Department of Environmental Quality

bgs ..... below ground surface
BMGR ..... Barry M. Goldwater Range

COC ..... chain of custody
CPR ..... cardiopulmonary resuscitation

DOD ..... United States Department of Defense
DON ..... United States Department of the Navy
DPT ..... direct push technology
DQO ..... data quality objective

EB ..... equipment blank
ELAP ..... Environmental Laboratory Accreditation Program

FB ..... field blank
FTL ..... field team leader

GPL ..... groundwater protection level

HAZWOPER ..... Hazardous Waste Operations and Emergency Response
H&S ..... Health & Safety

IDW ..... investigation-derived waste

JV ..... Joint Venture

MCL ..... maximum contaminant level
MCAS ..... Marine Corps Air Station
MS ..... matrix spike
MSD ..... matrix spike duplicate
MTR ..... Munitions Treatment Range

NAVFAC ..... Naval Facilities Engineering Systems Command
NAVFAC SW ..... Naval Facilities Engineering Systems Command Southwest

OSHA ..... Occupational Safety and Health Administration

PM ..... Project Manager

QA ..... quality assurance
QC ..... quality control
QSM ..... quality systems manual

RCRA ..... Resource Conservation and Recovery Act
rSRL ..... residential soil remediation level

SAP ..... Sampling and Analysis Plan
SOP ..... standard operating procedure
SOW ..... scope of work
SRL ..... soil remediation levels
SSHO ..... Site Safety & Health Officer
SSHP ..... Site Health and Safety Plan
SVOC ..... semi-volatile organic compound

TO ..... task order
TPH ..... total petroleum hydrocarbon

UFP ..... Uniform Federal Policy
UFP-QAPP ..... Uniform Federal Policy for Quality Assurance Project Plans
USEPA ..... United States Environmental Protection Agency

VOC ..... volatile organic compound

Executive Summary

This Sampling and Analysis Plan (SAP) describes the rationale, scope of work (SOW), procedures, and methodologies to be employed during the collection and analysis of samples from active shotholes, pits of fragmentation, and White Phosphorus detonation areas at the Munitions Treatment Range (MTR) at Marine Corps Air Station (MCAS) Yuma. This SAP will be utilized for annual sampling. The MTR is illustrated in Figure 1 and Figure 2.

The overall quality of tasks performed for this project will be assured by conformance to protocols established for sample collection, analytical procedures, and data management. The purpose of this SAP is to present a sampling strategy, including a field sampling methodology and the quality assurance/quality control (QA/QC) protocols that will be implemented throughout the project. The objective of the sampling event is to characterize the environmental conditions present at the MTR through the collection of surface and subsurface soil samples.

All samples will be analyzed at an Environmental Laboratory Accreditation Program (ELAP)-certified fixed-base laboratory for the following:

- Explosives, EPA Method 8330;
- Perchlorate, EPA Method 6850;
- White Phosphorus, EPA Method 7580;
- Metals, EPA Methods 6010B and 7471;
- Semi-volatile organic compounds (SVOCs), EPA Method 8270; and
- Volatile organic compounds (VOCs), EPA Method 8260.

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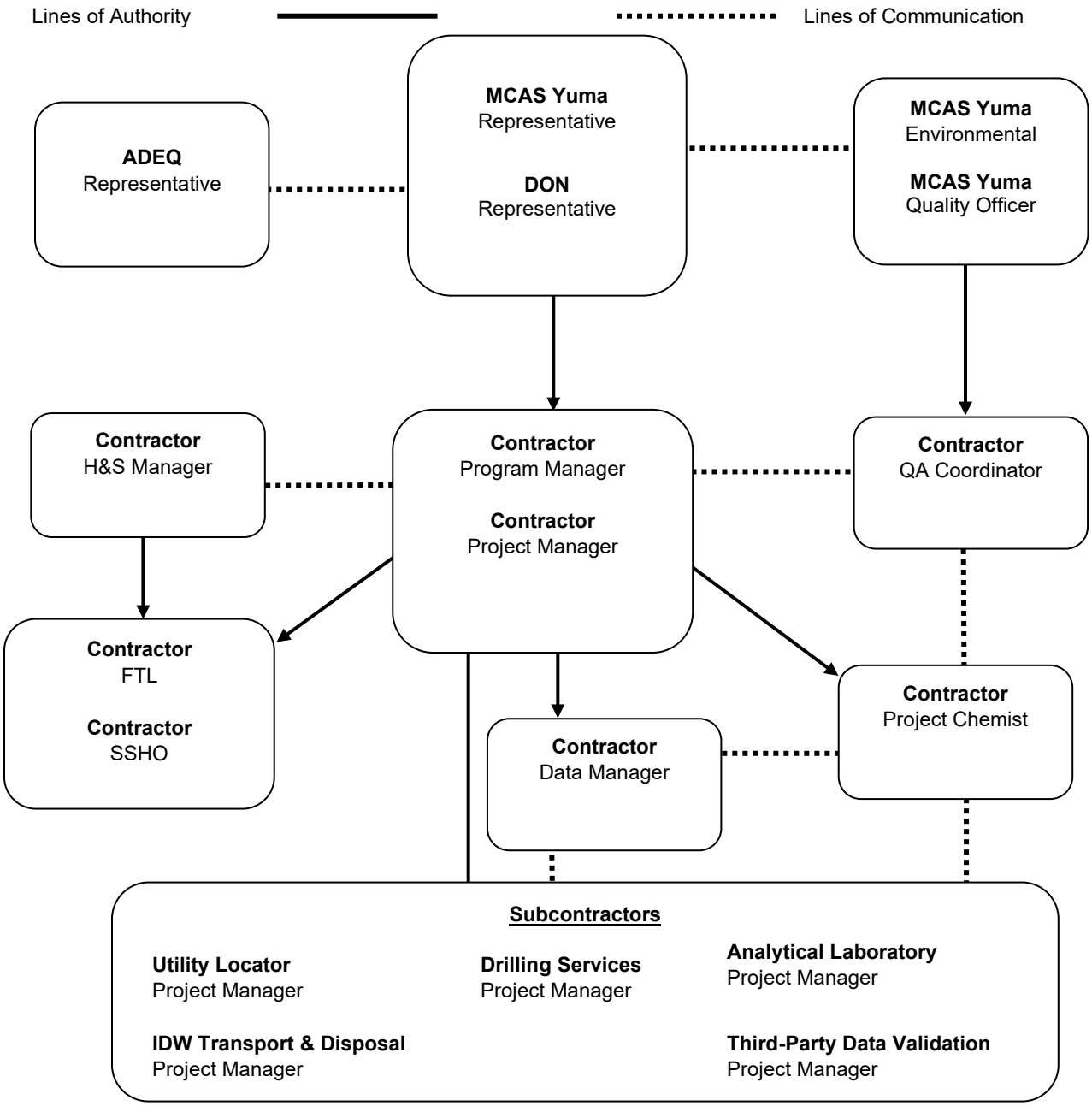
1.0 Responsibilities and Lines of Authority

Project Organizational Chart



ADEQ = Arizona Department of Environmental Quality; DON = Department of the Navy; FTL = Field Team Leader; H&S = Health and Safety; IDW = investigation-derived waste; JV = Joint Venture; MCAS = Marine Corps Air Station; QC = quality control; SSHO = Site Safety & Health Officer

1.1 Project Stakeholders

- MCAS Yuma – Lead Agency/Permit Holder
- Department of the Navy (DON) – Contract Execution and Management
- Arizona Department of Environmental Quality (ADEQ) - Lead Regulatory Agency

1.2 Project Manager (PM)

The PM is the primary point of contact for the project team and stakeholders. They are responsible for comprehensive oversight and final decision-making for the project. The PM coordinates work activities and subcontractor personnel, ensuring that field activities are performed in accordance with the SAP. They promote a safe work environment for all project personnel by applying work guidelines specified in the Site Health and Safety Plan (SSHP) and all applicable Occupational Safety and Health Administration (OSHA) regulations. Additionally, the PM serves as a technical resource to the project team and stakeholders.

1.3 Field Team Leader (FTL)

The FTL directs site activities following the approved SAP and Federal, state, and applicable local laws and regulations. The FTL provides direction to the field staff and subcontractors and has the responsibility and authority to halt or modify any working conditions and remove any person who refuses to comply with the site plans or whose behavior endangers their safety or the safety of others. The FTL may also have collateral duties, such as the SSHO.

1.4 Quality Assurance Coordinator

The Quality Assurance Coordinator ensures the project-specific SAP conforms to current NAVFAC requirements. They review and approve the SAP, communicate with the PM, and notify them of any deviations from the SAP and nonconformance issues. Additionally, they coordinate field and laboratory QA, oversee field QA and project QA compliance, and hold the authority to suspend project activities if QA requirements are not met.

1.5 Site Safety and Health Officer (SSHO)

The SSHO will provide day-to-day support, conduct tailgate safety meetings, verify training and medical clearances of on-site personnel, and report activities to the PM. The SSHO is the primary contact in any on-site emergency. The SSHO is responsible for facilitating and coordinating the field implementation of the SSHP and has the responsibility and authority to halt or modify hazardous activities or working conditions.

2.0 Project Technical Design

2.1 Project Description / Background

Marine Corps Air Station (MCAS) Yuma is located in the City of Yuma in the southwestern corner of Arizona. The Barry M. Goldwater Range (BMGR), a 2.8-million-acre area, is divided into two segments; the eastern two-thirds is designated the Gila Bend segment (approximately 1.6 million acres), and the western third is designated the Yuma segment. The Yuma segment occupies approximately 760,000 acres and is operated by MCAS Yuma. MCAS Yuma operates four sub-ranges in the BMGR: two manned ranges, an air-to-air gunnery range, and an air combat maneuvering range. These sub-ranges have been important MCAS Yuma facilities for training pilots in aerial and air-to-ground combat since 1941.

The MTR, a 1000-meter square area located on the far western boundary of the Yuma segment of the BMGR, is regulated under RCRA. The MTR facility is used to treat ordnance stockpiled at MCAS Yuma as well as ordnance and explosive end items from other military bases and bombing ranges, from local government-owned manufacturing facilities, and local manufacturers under contract to the United States government located in Arizona and California.

The MTR was formerly used for open burning and open detonation. The two former open burn trenches were clean-closed in accordance with federal and State of Arizona regulations and requirements in October 1998. The MTR is used for open detonation activities, including fragment, non-fragment, and white phosphorus. There are currently two main detonation areas: the Class A and B Detonation Area and the White Phosphorus Detonation Area. Both detonation areas are in the central portion of the MTR.

2.2 Data Quality Objectives (DQOs)

The purpose of the investigation is to evaluate the potential for soil contamination due to ongoing activities at the MTR. The goal is to collect soil data to characterize the soil at the MTR.

The Decision Rules for this investigation are based upon a comparison of laboratory analytical results to residential soil remediation levels (rSRL) or groundwater protection levels (GPL) established by ADEQ (Section 10.0).

The principal Decision Rules for this sampling are:

a) **If** the concentrations of hazardous substances in the active shotholes/pits exceed the residential SRLs or GPLs, **then** a work plan for further investigation and/or remediation will be developed and submitted to ADEQ.

b) **If** the concentrations of hazardous substances in the soil samples in the active shotholes/pits do not exceed the residential SRLs and GPLs, **then** no further action will be necessary.

2.3 Sampling Points

Up to five soil borings will be installed at active shothole(s)/pit(s) of a detonation area using direct push technology (DPT) to 10 feet below ground surface (bgs). Up to three soil samples will be collected from each boring (up to 15 total samples) from depths of approximately 0-1.5 feet bgs, 4.5-6 feet bgs, and 8.5-10 feet bgs (Figure 2).

2.4 Sample Method

The DPT rig with a 2-inch-diameter sampling tube lined with acetate sleeves will collect the subsurface soil samples as the boring advances. Grab soil samples will be collected from the acetate sleeve. Subsurface soil sampling will be conducted in accordance with the procedures described in this SAP and standard operating procedure (SOP) SOP 07 *Subsurface Soil Sampling* (Attachment 1). Soil samples will be logged in accordance with ASTM Method D2487 *Standard Practice for Clarification of Soils for Engineering Purposes*.

2.5 Analytical Methods

Subsurface soil samples collected from the MTR will be analyzed for:

- Explosives by EPA Method 8330,
- Perchlorate by EPA Method 6850,
- White Phosphorus by EPA Method 7580,
- Metals by EPA Methods 6020B/7471A,
- SVOCs by EPA Method 8270, and
- VOCs by EPA Method 8260D

All samples will be sent to a laboratory certified by the United States Department of Defense (DoD) ELAP and the State of Arizona. Analyses will comply with the DoD Quality Systems Manual (QSM) Version 5.4 (DoD, 2021).

2.6 Quality Control (QC) Activities

QC samples will be collected at a frequency designated in Section 4.0. QC samples will include matrix spikes (MS) and matrix spike duplicates (MSD), equipment blanks (EB), and field blanks (FB). If reusable sampling equipment is used, an EB will be collected from decontaminated sampling equipment. Analytical methods will include performing initial calibrations, continuing calibration, tuning, laboratory blanks, replicates, laboratory control spikes, and other applicable QC as defined by *DoD QSM Version 5.4* (DoD, 2021).

Field duplicates will not be collected for soil samples. Due to the heterogeneity of the soil matrix, soil duplicates are inherently more variable than aqueous duplicates, and quantifying the variability is not necessary to support the project DQOs because sample variability from a specific sampling location is expected to have minimal impact on the identification of locations requiring additional characterization.

Field blanks will be collected using the same deionized water source used to decontaminate the sampling equipment in the field. The field blank will be shipped back to the laboratory and analyzed with the remaining samples.

Samples will be collected, managed, and shipped to the selected laboratory in accordance with the guidelines presented in SOP 01 *Sample Custody* and SOP 02 *Packaging and Shipping Environmental Samples* (Attachment 1).

3.0 Special Training Requirements

As specified in the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements (Title 29 CFR 1910.120), routine training applies to those conducting fieldwork. The regulation states that all personnel involved in the characterization or remediation of an uncontrolled hazardous waste site must have 40 hours of certified training and three days of supervised field experience. In compliance with Title 29 CFR 1910.120, “general site workers,” those individuals performing field activities such as collecting media samples, will have completed the appropriate OSHA HAZWOPER training course.

Personnel on-site for occasional inspection and sampling activities are unlikely to experience exposure over the permissible and published exposure limits. They may be considered “workers on site only occasionally for a specific limited task.” These workers must have 24 hours of training and one day of field experience. Employees with minimal (low risk) exposure or low probability of exposure to hazardous substances are covered by other OSHA standards, such as the Hazard Communication Standard, Title 29 CFR 1910.120.

All site workers will be 40-hour trained and meet the minimum standard for supervised field experience. In compliance with regulatory procedures related to training, at least one supervisor, having received the OSHA 8-hr Hazardous Waste Supervisor training, will be on-site at all times. All employees have been trained in first aid and cardiopulmonary resuscitation (CPR). At least one employee, properly trained and certified in adult first aid and CPR, will be assigned and on-site at all times work is being performed.

4.0 Field Sampling Tables

Sampling Containers and Preservation Requirements:

Matrix	Analyte	Sample Volume	Container	Preservation	Holding Time (Prep/Analysis)
Soil	Explosives	30-g	4-oz Glass Jar	4 ± 2°C	14 days / 40 days
	Perchlorate	10-g	4-oz Glass Jar	4 ± 2°C	28 days
	White Phosphorus	40-g	8-oz Amber Glass	4 ± 2°C No Headspace	30 days to analysis
	Metals	2-g	4-oz Glass Jar	4 ± 2°C	180 days
	VOCs	(3) 5-g	(3) 5-g Terra Core Samplers	4 ± 2°C	14 days
	SVOCs	30-g	4-oz Glass Jar	4 ± 2°C	14 days / 40 days

Notes:

ºC = degrees Celsius; g = gram; oz = ounce; SVOC = semi-volatile organic compound; VOC = volatile organic compound

Field Quality Control Sample Summary

Matrix	Analytical Group	Number of Samples[1]	Number of MS/MSDs (5%)	Field Blanks	Trip Blanks[2]	Equip. Blanks	Temperature Blanks	Total Number of Samples to Lab
Soil	Explosives	15	1/1	1	0	1	One per cooler	19
	Perchlorate	15	1/1	1	0	1		19
	White Phosphorus	15	1/1	1	0	1		19
	Metals	15	1/1	1	0	1		19
	VOCs	15	1/1	1	1	1		20
	SVOCs	15	1/1	1	0	1		19

Notes:
[1] The number of samples assumes 1 day of field sampling activities.
[2] One per ice chest containing VOC samples.

MS/MSD = matrix spike/matrix spike duplicate; SVOC = semi-volatile organic compound; VOC = volatile organic compound

5.0 Field Procedures

All project-specific tasks and procedures will be performed in accordance with the following field SOPs (Attachment 1).

- SOP 01 – Sample Custody
- SOP 02 – Packaging and Shipping Environmental Samples
- SOP 03 – Field Logbook Content and Control
- SOP 04 – Field Sample Numbering
- SOP 05 – Drilling
- SOP 06 – Lithologic Logging
- SOP 07 – Subsurface Soil Sampling
- SOP 10 – Decontamination of Field Equipment

6.0 Sample Handling and Custody Requirements

To provide a method of tracking each sample through collection, analysis, data review, and data reduction, a sample identification (ID) system has been established for the MTR sampling activities. Sample IDs will be assigned in the field according to the following system:

- A designation of the month, year, and site name followed by a hyphen.
- A designation for the sample location and sample number followed by a hyphen.
- A designation for the sample number followed by a hyphen.
- A designation for the sample type (i.e., primary [1]).

An example of the sample ID is:

0325MTR-AB1-0.0-01-1

Example: 0325 (March 2025)+MTR, Sample location (AB – Class A and B Detonation Area, WP – White Phosphorus Detonation Area), Sample/Number (1), Depth (0.0’), First Sample Collected (01), Primary Sample (1)

[Sample Types: 1 = primary, 2 = duplicate, 3 = equipment blank, 4 = trip blank, 5 = field blank]

Field QC samples subjected to chemical analysis, such as EBs, FBs, and trip blanks (TB), will be sequentially numbered as collected in the field with site characterization samples. Field QC samples will be submitted to the laboratory under blind identification. Field QC samples will not be identified as QC samples in the sample name or on the Chain of Custody (COC).

In the following hypothetical example, the first samples collected at the site are from the Class A and B Detonation Areas (AB).

- A soil sample is collected.
- An EB sample is collected.
- Following the sampling, an FB is collected.

In accordance with the protocol described above, the samples would be named as follows:

- The soil sample: **0325MTR-AB1-0.0-01-1**
- The EB sample: **0325MTR-AB1-0.0-02-3**
- The FB sample: **0325MTR-AB1-0.0-03-5**

Each sample collected will be labeled with the unique sample ID, date and time the sample was collected, preservation used, the sampler's initials, and the analysis to be performed. Each sample will then be logged onto a COC form for delivery to the laboratory. All samples will be sent to the laboratory via overnight courier delivery (i.e., FedEx). Temperature blanks will be labeled as temperature blanks. Temperature blanks are not subject to chemical analysis.

The field logbook will document cross-reference information regarding the assigned sample identification number and whether the sample is a field quality control sample. These logbooks will be maintained in the project file.

7.0 Field Instrument, Equipment, and Supplies (Testing and Maintenance Requirements)

Field Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Photoionization Detector (PID)	Calibration	Daily	Calibrate to known standards	Return to manufacturer for repair; Replace with rental unit	Field Team Lead	Manufacturer User Manual

Notes:

Rental equipment and instruments are frequently used in the field. The rental firms will be responsible for the proper care, maintenance, and repair of these items, and for tracking and documenting equipment and instrument maintenance and repairs.

8.0 Field Implementation (Field Instructions)

This section presents the field activities during soil sampling at the MTR.

8.1 Field Tasks

Field activities include the following:

- DPT drilling/soil sampling
- Equipment decontamination
- Remediation-derived waste management

8.1.1 Pre-Field Activities

Prior to the initiation of fieldwork, site reconnaissance and preparation will be performed to understand where key features are located. Reconnaissance will include verifying the hospital location, identifying access points to restricted areas, the soil boring locations, base support facilities, and other key features. Preparation will involve setting up equipment and the work area (e.g., laydown, decontamination) as appropriate.

8.1.2 DPT Drilling/Soil Sampling

Five soil borings will be completed using a DPT drill rig to a maximum depth of up to 10 feet bgs. The DPT rig with a 2-inch-diameter sampling tube lined with acetate sleeves will collect the subsurface soil samples as the boring advances.

Three subsurface soil samples per boring (up to 15 samples) will be collected as follows:

- The first sample interval will be at a depth of approximately 0-1.5 feet bgs.
- The second sample interval will be at a depth of approximately 4.5-6.0 feet bgs.
- The third sample interval will be at a depth of approximately 8.5-10 feet bgs.

Subsurface soil sampling will be conducted in accordance with the procedures described in this SAP and SOP 07 *Subsurface Soil Sampling* (Attachment 1). Soil samples will be logged following ASTM Method D2487 *Standard Practice for Clarification of Soils for Engineering Purposes*.

Subsurface soil samples will be collected from three sample intervals by DPT. A 2-inch DPT macrocorer will be advanced to the sampling target depth, the core will be retrieved and sliced open, and a geologist will document lithology.

Subsurface soil sampling procedures for soil sample collection using DPT are as follows:

1. When collecting or handling soil samples, wear disposable nitrile gloves to prevent cross-contamination and provide personal protection. New gloves will be donned for sample collection at each sampling location or interval or whenever gloves are torn or otherwise compromised.
2. Between each sampling location and prior to each sampling run, the sampler, sleeves, and other nondisposable sampling equipment will be decontaminated as described in SOP 10 *Decontamination of Field Equipment* (Attachment 1).
3. The probe rods equipped with a solid drive tip will be advanced to the desired depth or target horizon where the sampling run begins. Additional probe rods will be added to reach the specified sampling depth. After reaching the target depth, the center rods and drive tip will be removed, and a new acetate liner will be attached to the center rod string.
4. The DPT contractor will remove the liner and present it to the field geologist/engineer for inspection and sample collection. Upon receiving the liner, the field geologist/engineer will observe and record the amount of sample recovery and any associated problems. The field geologist/engineer will cut the sample in the desired interval.
5. The boring log will document any observed field problems associated with the sampling attempt (e.g., refusal) or lack of recovery.
6. A depth discrete soil sample will be collected and the soil will be transferred directly from the liner to the sample container.
7. Record the location/depth of each subsurface soil sample on the soil/boring log.
8. Soil sample selection will be based on four factors: (1) judgment that the sample represents relatively undisturbed intact material, not slough; (2) proximity to the drive shoe; (3) lithology; and (4) obvious evidence of contamination. The soil core will also be visually recorded on a boring log.

Each soil sample will be labeled appropriately and numbered to be submitted for analysis in accordance with the procedures in Section 6.0. Soil samples will be sent to a laboratory certified by the DoD and State of Arizona ELAP for analyses listed in Section 10.0.

8.2 Decontamination

All sampling equipment and larger equipment (e.g., drill rig and downhole equipment) will be thoroughly decontaminated before initiating any site work in accordance with SOP 10 *Decontamination of Field Equipment* (Attachment 1). Larger equipment decontamination will be performed using potable water followed by a deionized water rinse. All reusable sampling equipment and large equipment will be decontaminated before use at each sampling location to minimize the potential for contaminant migration or cross-contamination. Equipment decontamination areas will be located within or adjacent to the

fieldwork area, as designated by supervising field personnel.

Sampling equipment decontamination will be conducted as follows:

1. Potable water and nonphosphate detergent (i.e., Liquinox™) wash (using brushes or a steam cleaner, as appropriate),
2. Potable water rinse,
3. Distilled or deionized water rinse,
4. Equipment air-dried and stored until used.

The effectiveness of the decontamination procedures will be tested by collecting one equipment blank per day for sampling equipment use.

Reusable personal protective equipment shall be inspected for indications of defects and contamination. If indications of contamination are detected on these materials, they will be decontaminated so they can be reused. If defects are identified, reusable personal protective equipment will be disposed of as municipal waste.

Disposable chemical-resistant gloves (i.e., nitrile gloves) will be placed in plastic trash bags and disposed of as municipal waste. Field personnel should wash their hands and shower after leaving the site.

8.3 Remediation-Derived Waste Management

The following waste streams are anticipated to be generated during drilling and soil sampling activities:

- Personal protective equipment and general debris
- Equipment decontamination wastewater

Liquids produced by this project will be containerized and stored in Department of Transportation-approved drums. Drummed liquid waste will be stored temporarily on double containment pallets or within a liquid waste containment area. Nonhazardous solid waste will be disposed of as municipal waste or, if possible, recycled. Nonhazardous personal protective equipment, general debris, and decontaminated waste materials will be disposed of at the end of each day and will not be accumulated.

Waste disposal will be determined based on the analytical results of the media in question. Contaminated waste will be transported to an authorized disposal facility following local, state, and federal regulations.

8.4 Field Quality Control Sampling

QA is an integrated system of activities in quality planning, assessment, and improvement to provide the project with a measurable assurance that the established standards of quality are met. QC checks, including field and laboratory, are specific operational techniques and activities to fulfill the QA requirements.

Field QC samples each quarter will include an equipment blank, trip blank, and field blank. Although technically considered laboratory QC samples, matrix spike (MS) and matrix spike duplicate (MSD) samples will also be collected in the field. QC samples will be collected at the frequencies described in Section 4.0.

8.4.1 Equipment Blank

An equipment blank (EB) will be collected at a rate of one per day when nondisposable field sampling equipment is decontaminated. EBs are samples of DI water exposed to the surface of non-dedicated decontaminated sampling equipment. The EB is collected during the final rinse of the sampling equipment after decontamination procedures are performed. EBs are analyzed for the same parameters as field samples to evaluate the effectiveness of field decontamination procedures.

8.4.2 Trip Blank

Each cooler containing VOC samples shipped to the laboratory will include a trip blank. Trip blanks are used when the collection of VOC samples is required and serve to detect and identify any VOC contaminant in the samples while traveling to the lab. This blank represents the “trip” the volatile vials take from leaving the laboratory with the bottle order to the field for sample collection and back to the lab for testing. The laboratory creates trip blanks by filling volatile vial containers with laboratory-grade DI water and sealing the container. The laboratory will provide trip blanks, which will not be opened until they return to the lab for testing.

8.4.3 Field blank

One field blank will be collected and analyzed per sampling event per water source. Field blanks are analyzed to assess contamination introduced during field sampling procedures and sample shipment. Field blanks, consisting of samples of the source water used, will be analyzed to evaluate whether the wash or rinse water contained contaminants that may have been carried over into the samples.

8.4.4 Matrix Spike Samples

MS and MSD samples are designed to check the precision and accuracy of the analytical methods through the analysis of a field sample with a known amount of analyte added (spiked). The additional sample volume of MS and MSD samples is collected in the field in the same manner as field samples. In the laboratory, two portions of the sample are spiked with a standard solution of target analytes. MS and MSD samples are analyzed for the same parameters as the field samples, and analytical results will be evaluated for the precision and accuracy of the laboratory process and the effects of the sample matrix. MS/MSD samples are collected at one per 20 field samples.

8.5 Field Documentation

All field data will be recorded in ink on the forms listed below. The Field Team Lead or designee will review field data and records. Instrument selections and use, including calibration and standardization, field deviations, and sampling limitations, will be recorded on the daily field log. A bound field logbook may be used instead of the daily field log to document daily field activities.

The reviewer will initialize field records before they are incorporated into reports or used in program decisions. Changes or corrections to field form entries will be completed by striking out the incorrect entry with a single line, initialing (by the person correcting), and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information should be written clearly above the crossed-out item.

Daily activities will be recorded using the following field documentation:

- Field logbook/field forms
- Boring log
- Sample collection log
- Chain-of-custody form

Field logbooks, field forms, chain-of-custody forms, correspondence, and project reports will be maintained in electronic format at the completion of the project.

8.6 Field SOPs Reference Table

SOP Number	Title	Revision Date	Location of SOP	Deviations for Project Work	Comments
SOP 01	Sample Custody	9/20/2021	Attachment 1	None	None
SOP 02	Packaging and Shipping Environmental Samples	9/20/2021		None	None
SOP 03	Field Logbook Content and Control	9/20/2021		None	None
SOP 04	Field Sample Numbering	9/20/2021		None	None
SOP 05	Drilling	9/20/2021		None	None
SOP 06	Lithologic Logging	9/20/2021		None	None
SOP 07	Subsurface Soil Sampling	9/20/2021		None	None
SOP 10	Decontamination of Field Equipment	9/20/2021		None	None

Notes:
Copies of field SOPs are provided in Attachment 1.

SOP = standard operating procedure

8.7 Sample Details Table

Sampling Location	Matrix	Depth (feet bgs)	Analytical Groups	Number of Samples
Soil Boring 1	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10	Explosives Perchlorate White Phosphorus Metals SVOCs VOCs	3
Soil Boring 2	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 3	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 4	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 5	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 6	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 7	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 8	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 9	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 10	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 11	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3

Sampling Location	Matrix	Depth (feet bgs)	Analytical Groups	Number of Samples
Soil Boring 12	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10	Explosives Perchlorate White Phosphorus Metals VOCs SVOCs	3
Soil Boring 13	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 13	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 15	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3

Notes:
bgs = below ground surface; SVOC = semi-volatile organic compound; VOC = volatile organic compound

9.0 Reference Limits and Screening Criteria

Matrix: Soil
Analytical Group: Explosives
Analytical Method: USEPA Method 8330

Analyte	CAS Number	Project Screening Criteria (mg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory Limits	
					RL (mg/kg)	MDL (mg/kg)
HMX	2691-41-0	3,100	rSRL	0.4	0.4	0.1
RDX	121-82-4	5	rSRL	0.4	0.4	0.1
1,3,5-TNB	99-35-4	1,800	rSRL	0.4	0.4	0.1
1,3-DNB	99-65-0	6.1	rSRL	0.4	0.4	0.1
2,4-DNT	121-14-2	120	rSRL	0.4	0.4	0.1
2,6-DNT	606-20-2	61	rSRL	0.4	0.4	0.1
2,4,6-TNT	118-96-7	18	rSRL	0.4	0.4	0.1
2-AM-4,6-DNT	35572-78-2	NE	NA	0.4	0.4	0.1
2-Nitrotoluene	88-72-2	NE	NA	0.4	0.4	0.1
3-Nitrotoluene	99-08-1	NE	NA	0.4	0.4	0.1
4-AM-2,6-DNT	19406-51-0	NE	NA	0.4	0.4	0.1
4-Nitrotoluene	99-99-0	NE	NA	0.4	0.4	0.1
Tetryl	479-45-8	NE	NA	0.4	0.4	0.1
Nitrobenzene	98-95-3	20	rSRL	0.4	0.4	0.1

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.

mg/kg = milligram per kilogram; DNB = dinitrobenzene; DNT = dinitrotoluene; HMX = octogen; MDL = method detection limit; NA = not applicable; NE = not established; RDX = hexogen; RL = reporting limit; rSRL = residential soil remediation level; TNB = trinitrobenzene; TNT = trinitrotoluene

Matrix: Soil
Analytical Group: Perchlorate
Analytical Method: USEPA Method 6850

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Perchlorate	7601-90-3	55,000	rSRL	4	4	1

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/kg = microgram per kilogram; MDL = method detection limit; RL = reporting limit; rSRL = residential soil remediation level

Matrix: Soil
Analytical Group: White Phosphorus
Analytical Method: USEPA Method 7580

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
White Phosphorus	7723-14-0	1,600	rSRL	1	1	0.24

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/kg = microgram per kilogram; MDL = method detection limit; RL = reporting limit; rSRL = residential soil

Matrix: Soil
Analytical Group: Metals
Analytical Method: USEPA Method 6020B/7471A

Analyte	CAS Number	Project Screening Criteria (mg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory Limits	
					RL (mg/kg)	MDL (mg/kg)
Arsenic	7440-38-2	10	rSRL	1	0.5	0.1
Barium	7440-39-3	15,000	rSRL	1	0.5	0.1
Cadmium	7440-43-9	29	GPL	1	0.5	0.1
Chromium	7440-47-3	30	rSRL	1	0.5	0.1
Lead	7439-92-1	290	GPL	1	0.5	0.1
Mercury	7439-97-6	12	GPL	1	0.1	0.02
Selenium	7782-49-2	290	GPL	1	0.5	0.1
Silver	7440-22-4	390	rSRL	1	0.5	0.1

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
mg/kg = milligram per kilogram; GPL = groundwater protection level; MDL = method detection limit; RL = reporting limit; rSRL = residential soil remediation level

Matrix: Soil
Analytical Group: VOCs
Analytical Method: USEPA Method 8260D

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					LOD (µg/kg)	DL (µg/kg)
Acetone	67-64-1	14,000,000	rSRL	10	10	5
Benzene	71-43-2	650	rSRL	5	5	1
Bromobenzene	108-86-1	28,000	rSRL	5	5	1
Bromochloromethane	74-97-5	NE	NA	5	5	1
Bromodichloromethane	75-27-4	830	rSRL	5	5	1
Bromoform	75-25-2	69,000	rSRL	5	5	2
Bromomethane	74-83-9	3,900	rSRL	10	10	2
2-Butanone (MEK)	78-93-3	23,000,000	rSRL	10	10	5
n-Butylbenzene	104-51-8	41,000	GPL	5	5	1
sec-Butylbenzene	135-98-8	39,000	GPL	5	5	1
tert-Butylbenzene	98-06-6	69,000	GPL	5	5	1
Carbon disulfide	75-15-0	122,000	GPL	5	5	1
Carbon tetrachloride	56-23-5	250	rSRL	5	5	1
Chlorobenzene	108-90-7	150,000	rSRL	5	5	1
Chloroethane	75-00-3	3,000	rSRL	5	5	2
Chloroform	67-66-3	940	rSRL	5	5	1
Chloromethane	74-87-3	48,000	rSRL	5	5	2
2-Chlorotoluene	95-49-8	NE	NA	5	5	1
4-Chlorotoluene	106-43-4	NE	NA	5	5	1
Dibromochloromethane	124-48-1	1,100	rSRL	5	5	1
1,2-Dibromo-3-chloropropane	96-12-8	530	rSRL	5	5	2
1,2-Dibromoethane	106-93-4	29	rSRL	5	5	1
Dibromoethane	74-95-3	NE	NA	5	5	1
1,1-Dichloroethane	75-34-3	510,000	rSRL	5	5	1
1,2-Dichloroethane	107-06-2	230	GPL	5	5	1
1,2-Dichlorobenzene	95-50-1	600,000	rSRL	5	5	1
1,3-Dichlorobenzene	541-73-1	530,000	rSRL	5	5	1

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					LOD (µg/kg)	DL (µg/kg)
1,4-Dichlorobenzene	106-46-7	3,500	rSRL	5	5	1

VOCs by 8260D / Soil - Continued

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Dichlorodifluoromethane	75-71-8	94,000	rSRL	5	5	2
1,1-Dichloroethene	75-35-4	120,000	rSRL	5	5	1
cis-1,2-Dichloroethene	156-59-2	43,000	rSRL	5	5	1
trans-1,2-Dichloroethene	156-60-5	69,000	rSRL	5	5	1
1,1-Dichloropropene	563-58-6	NE	NA	5	5	1
1,2-Dichloropropane	78-87-5	340	rSRL	5	5	1
1,3-Dichloropropane	142-28-9	100,000	rSRL	5	5	1
2,2-Dichloropropane	594-20-7	NE	NA	5	5	2
cis-1,3-Dichloropropene	10061-01-5	NE	NA	5	5	1
trans-1,3-Dichloropropene	10061-02-6	NE	NA	5	5	1
Ethylbenzene	100-41-4	82,000	GPL	5	5	1
2-Hexanone (MBK)	591-78-6	NE	NA	10	10	5
Hexachlorobutadiene	87-68-3	7,000	rSRL	5	5	2
Isopropylbenzene	98-82-8	92,000	rSRL	5	5	2
p-Isopropyltoluene	99-87-6	NE	NA	5	5	1
Methylene Chloride	75-09-2	9,300	rSRL	10	10	2
4-Methyl-2-pentanone(MIBK)	108-10-1	5,300,000	rSRL	10	10	5
tert-Butyl methyl ether	1634-04-4	32,000	rSRL	5	5	1
Naphthalene	91-20-3	4,000	GPL	10	10	2
n-Propylbenzene	103-65-1	41,000	GPL	5	5	1
Styrene	100-42-5	1,500,000	rSRL	5	5	1
1,1,1,2-Tetrachloroethane	630-20-6	3,200	rSRL	5	5	1
1,1,2,2-Tetrachloroethane	79-34-5	420	rSRL	5	5	1
Tetrachloroethene	127-18-4	510	NA	5	5	1
Toluene	108-88-3	159,000	GPL	5	5	1
1,1,1-Trichloroethane	71-55-6	1,200,000	rSRL	5	5	1
1,1,2-Trichloroethane	79-00-5	740	rSRL	5	5	1
1,2,3-Trichlorobenzene	87-61-6	NE	NA	5	5	2

VOCs by 8260D / Soil - Continued

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
1,2,4-Trichlorobenzene	120-82-1	62,000	rSRL	5	5	2
Trichloroethene	79-01-6	3,000	rSRL	5	5	1
Trichlorofluoromethane	75-69-4	390,000	rSRL	5	5	2
1,2,3-Trichloropropane	96-18-4	5	rSRL	5	5	2
1,2,4-Trimethylbenzene	95-63-6	26,000	GPL	5	5	2
1,3,5-Trimethylbenzene	108-67-8	6,000	GPL	5	5	2
Vinyl Chloride	75-01-4	85	rSRL	5	5	2
Xylenes	1330-20-7	270,000	rSRL	10	10	2

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/kg = microgram per kilogram; GPL = groundwater protection level; MDL = method detection limit; NA = not applicable; NE = not established; RL = reporting limit; rSRL = residential soil remediation level; VOC = volatile organic compound

Matrix: Soil
Analytical Group: SVOCs
Analytical Method: USEPA Method 8270

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Acenaphthene	83-32-9	21,000	GPL	333	333	167
Acenaphthylene	208-96-8	NE	NA	333	333	167
Anthracene	120-12-7	1,000	GPL	333	333	167
Azobenzene	103-33-3	5,000	rSRL	333	333	167
Benzo(a)anthracene	56-55-3	690	rSRL	333	333	167
Benzo(a)pyrene	50-32-8	69	rSRL	333	333	167
Benzo(b)fluoranthene	205-99-2	690	rSRL	333	333	167
Benzo(g,h,i)perylene	191-24-2	NE	NA	333	333	167
Benzo(k)fluoranthene	207-08-9	6,900	rSRL	333	333	167
Benzyl Alcohol	100-51-6	18,000,000	rSRL	333	333	167
Bis(2-chloroethoxy)methane	111-91-1	NE	NA	333	333	167
Bis(2-chloroethyl)ether	111-44-4	230	rSRL	333	333	167

SVOCs by 8270 / Soil - Continued

Analyte	CAS Number	Project Screening Criteria[1] (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Bis(2-chloro-1-methylethyl)ether	108-60-1	3,000	rSRL	333	333	167
Bis(2-Ethylhexyl)phthalate	117-81-7	39,000	rSRL	333	333	167
4-Bromophenyl-phenylether	101-55-3	NE	NA	333	333	167
Butylbenzylphthalate	85-68-7	12,000,000	rSRL	333	333	167
Carbazole	86-74-8	27,000	rSRL	333	333	167
4-Chloro-3-methylphenol	59-50-7	NE	NA	333	333	167
4-Chloroaniline	106-47-8	240,000	rSRL	333	333	167
2-Chloronaphthalene	91-58-7	110,000	rSRL	333	333	167
2-Chlorophenol	95-57-8	63,000	rSRL	333	333	167
4-Chlorophenyl-phenylether	7005-72-3	NE	NA	333	333	167
Chrysene	218-01-9	640	GPL	333	333	167
Dibenzo(a,h)anthracene	53-70-3	690	rSRL	333	333	167
Dibenzofuran	132-64-9	140,000	rSRL	333	333	167
1,2-Dichlorobenzene	95-50-1	600,000	rSRL	333	333	167
1,3-Dichlorobenzene	541-73-1	530,000	rSRL	333	333	167
1,4-Dichlorobenzene	106-46-7	3,500	rSRL	333	333	167
3,3'-Dichlorobenzidine	91-94-1	1,200	rSRL	333	333	167
2,4-Dichlorophenol	120-83-2	180,000	rSRL	333	333	167
Diethylphthalate	84-66-2	49,000,000	rSRL	333	333	167
2,4-Dimethylphenol	105-67-9	1,200,000	rSRL	333	333	167
Dimethylphthalate	131-11-3	610,000,000	rSRL	333	333	167
Di-n-butylphthalate	84-74-2	6,100,000	rSRL	333	333	167
4,6-Dinitro-2-methylphenol	534-52-1	NE	NA	667	667	167
2,4-Dinitrophenol	51-28-5	120,000	rSRL	667	667	167
2,4-Dinitrotoluene	121-14-2	120,000	rSRL	333	333	167
2,6-Dinitrotoluene	606-20-2	61,000	rSRL	333	333	167
Di-n-octylphthalate	117-84-0	2,400,000	rSRL	333	333	167

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Fluoranthene	206-44-0	2,300,000	rSRL	333	333	167
Fluorene	86-73-7	26,000	GPL	333	333	167
Hexachlorobenzene	118-74-1	340	rSRL	333	333	167
Hexachlorobutadiene	87-68-3	7,000	rSRL	333	333	167
Hexachloroethane	67-72-1	39,000	rSRL	333	333	167
Indeno(1,2,3-cd)pyrene	193-39-5	690	rSRL	333	333	167
Isophorone	78-59-1	580,000	rSRL	333	333	167
2-Methylnaphthalene	91-57-6	NE	NA	333	333	167
2-Methylphenol	95-48-7	3,100,000	rSRL	333	333	167
4-Methylphenol	106-44-5	3,100,000	rSRL	333	333	167
Naphthalene	91-20-3	4,000	GPL	333	333	167
2-Nitroaniline	88-74-4	180,000	rSRL	333	333	167
3-Nitroaniline	99-09-2	18,000	rSRL	333	333	167
4-Nitroaniline	100-01-6	26,000	rSRL	333	333	167
Nitrobenzene	98-95-3	20,000	rSRL	333	333	167
2-Nitrophenol	88-75-5	NE	NA	333	333	167
4-Nitrophenol	100-02-7	NE	NA	667	667	167
n-Nitrosodimethylamine	62-75-9	11	rSRL	333	333	167
n-Nitroso-di-n-propylamine	621-64-7	78	rSRL	333	333	167
n-Nitrosodiphenylamine	86-30-6	110,000	rSRL	333	333	167
Pentachlorophenol	87-86-5	3,200	rSRL	667	667	167
Phenanthrene	85-01-8	NE	NA	333	333	167
Phenol	108-95-2	18,000,000	rSRL	333	333	167
Pyrene	129-00-0	14,000	GPL	333	333	167
1,2,4-Trichlorobenzene	120-82-1	62,000	rSRL	333	333	167
2,4,5-Trichlorophenol	95-95-4	6,100,000	rSRL	333	333	167
2,4,6-Trichlorophenol	88-06-2	6,100	rSRL	333	333	167

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.

µg/kg = microgram per kilogram; GPL = groundwater protection level; MDL = method detection limit; NA = not applicable; NE = not established; RL = reporting limit; rSRL = residential soil remediation level; SVOC = semi-volatile organic compound

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10.0 Assessments/Oversight

Formal field audits by QA personnel are not anticipated for this project. Identifying problems related to technical performance will be the responsibility of the technical staff working on this project. The Field Team Leader will assess any issues in the field, modify technical procedures if needed, and communicate with the Project Manager and any technical staff. Any changes in technical procedures will be documented in field notes and highlighted in reports related to this project.

Laboratory personnel will perform self-audits and institute corrective actions in accordance with their respective written procedures.

11.0 Data Verification and Validation

Data Verification (Step I) Process Table

Data Review Input	Description	Responsible for Verification
Chain of Custody Forms (COC)	The content of the COC will be reviewed daily and verified for completeness against the samples within the associated cooler. Once reviewed, a copy of the COC form will be filed with other project documents in the assigned project file. The original COC form will be taped inside the cooler for sample shipment.	Field Team Lead or Alternate
Fieldnotes/ Logbook	Field sampling data, i.e., field logbooks and field forms, will be reviewed and verified for completeness. Field notes/logbook will be forwarded to the Project Manager, reviewed, and placed in the project file. A copy of the field notes will be included with the monitoring reports.	Field Team Lead or Alternate
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the project file. If corrective actions are required, a copy of the documented corrective action taken will be attached to the appropriate audit report in the project file.	Field Team Lead or Alternate QA Coordinator or Alternate
Analytical Data Package	All laboratory data packages will be verified internally by the laboratory for completeness and technical accuracy before submission. All received data packages will be verified externally and internally according to the data validation process specified in the Validation (Steps II) Process Table below.	Laboratory PM QA Coordinator
Electronic Data Deliverables	The laboratory will verify 100% of electronic data deliverables internally, which will perform the work for completeness and technical accuracy between the EDD and the PDF copy data package before submission. 10% of received electronic data deliverables will be verified externally and internally against the laboratory data packages, with the percentage raised to 100% if discrepancies are found during the 10% verification.	Laboratory PM QA Coordinator

COC = chain of custody; EDD = electronic data deliverable; QA = quality assurance; PM = project manager

Data Validation (Steps II) Process Table

Validation Input	Description	Responsible for Validation
Communication	Establish that the required communication procedures were followed by field or laboratory personnel.	QA Coordinator
Methods (sampling and analysis)	Establish that the required sampling and analytical methods were implemented and that any deviations were noted. Evaluate whether proper procedures met performance criteria.	QA Coordinator
Location, maps, and sample ID numbers	Verify the accuracy and precision of the information under scrutiny.	Field Team Lead PM
Holding times	Ensure samples were analyzed within holding times specified in the method, procedure, or contract requirements. If holding times were not met, confirm that deviations were documented and appropriate notifications were made. Holding times or deviations will be noted in the lab analytical report.	QA Coordinator
List of project-specific analytes	Establish that the project-specific analytes were reported as specified in governing documents (i.e., analytical method, contract, etc.). Documentation will be in the lab analytical report.	QA Coordinator
Field logbook	Every week, the QA Coordinator or assignee will review and verify the completeness of the information in the field logbooks.	QA Coordinator or Alternate
Sampling instrument decontamination records	Establish that proper decontamination procedures were implemented by field sampling personnel.	QA Coordinator or Alternate
Chain of Custody Forms	Review COC records for completeness and accuracy daily. The QA Coordinator or assignee will look primarily for project information, sample analyses requested, and the number of field QC samples collected.	QA Coordinator or Alternate
Sample receipts	Check the sample cooler for compliance with temperature and packaging requirements.	QA Coordinator or Alternate

Validation Input	Description	Responsible for Validation
Sample logins	Review sample login for accuracy against the COC form.	QA Coordinator or Alternate
Sampling plan and procedures	Evaluate whether the sampling plan was executed as specified (i.e., the number, location, and type of field samples collected and analyzed as defined in the SAP). Evaluate whether sampling procedures were followed with respect to equipment and proper sampling support (i.e., techniques, equipment, decontamination, volume, preservation, temperature, etc.).	QA Coordinator or Alternate
Project quantitation limits	Determine that quantitation limits were achieved as outlined in the SAP and that the laboratory successfully analyzed a standard at the quantitation limit.	QA Coordinator
Performance criteria	Evaluate QC data against project-specific performance criteria in the SAP (i.e., evaluate quality parameters beyond those outlined in the methods).	QA Coordinator
Laboratory data packages	The QA Coordinator will validate laboratory data packages for technical accuracy. Review data packages for accuracy against the laboratory data.	QA Coordinator

Notes:

COC = chain of custody; QA = quality assurance; QC = quality control; SAP = Sampling and Analysis Plan

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12.0 Data Usability

The data usability assessment process is used to evaluate and document the usability of the data by considering the project DQOs and whether the data are suitable during the decision-making process. The analytical laboratory will be responsible for reviewing all analytical data generated under this contract to ensure that they meet the requirements of the SAP. Each analyst reviews the quality of their work based on established protocols specified in laboratory SOPs, analytical method protocol, project-specific requirements, and DQOs.

The data quality assessment process intends to establish the usability of the results with respect to the project DQOs. The usability assessment process will involve the QA Coordinator reviewing and evaluating the data for discrepancies or deviations. This assessment will assess the impact of the discrepancies or deviations on the usability of the data and evaluate whether all the necessary information has been provided for use in the decision-making process. Documentation of deviations in sampling activities, COC documentation, or holding times; compromised samples (i.e., damaged samples) and the need to resample; or changes to SOPs or methods that could potentially impact data quality will be provided in the soil monitoring report. QC sample results will be evaluated to assess whether unacceptable QC results (e.g., blank detections) impact data usability. Data use limitations will be discussed in the data usability assessment for data that do not meet the DQOs.

13.0 Documentation and Records

Field notes and measurements will be recorded in a field notebook, which the Field Team Leader will maintain. The respective laboratories performing the analyses will maintain original copies of COCs, raw data, and analytical results.

At the end of each day, the Field Team Leader will prepare a summary of the sampling activities for the day. The summary will be in writing but may be submitted as a hard copy or electronically. The summary should include the following:

- Name of Field Team Leader and Team Members
- Field and QC samples collected (including times)
- On-site measurements made and results obtained at each location
- Disposition of all samples (where they were delivered for analysis)
- Air bill numbers for all shipped samples
- Photocopies of COC
- Noteworthy Site observations

14.0 Quality Control/Data Management

Data from this sampling effort will be generated from three primary pathways: field activities, laboratory analytical data, and validated data. Data generated during field activities will be recorded using a field logbook and field forms. The field manager will review these forms for compliance with QC criteria established in the SAP for completeness and accuracy.

Upon sample arrival, the analytical laboratory will verify each sample's physical condition and ensure that all pertinent documentation associated with each sample is complete. Data generated from the laboratory analysis will be recorded in electronic data deliverables. Analytical laboratory staff will verify the data according to the process described in Section 12.0. The laboratory QA director will review the data before it is submitted for third-party data validation. Details on data validation and usability are provided in Sections 11.0 and 12.0.

Hardcopy field records, analytical laboratory data, and electronic data deliverables will be stored in a secure project file.

15.0 References

United States Department of Defense (DoD). 2021. *Quality Systems Manual for Environmental Laboratories, Version 5.4*. October.

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Figures

Figure 1: Area Location Map

Figure 2: MTR Site Location Map

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Figure 1: Area Location Map

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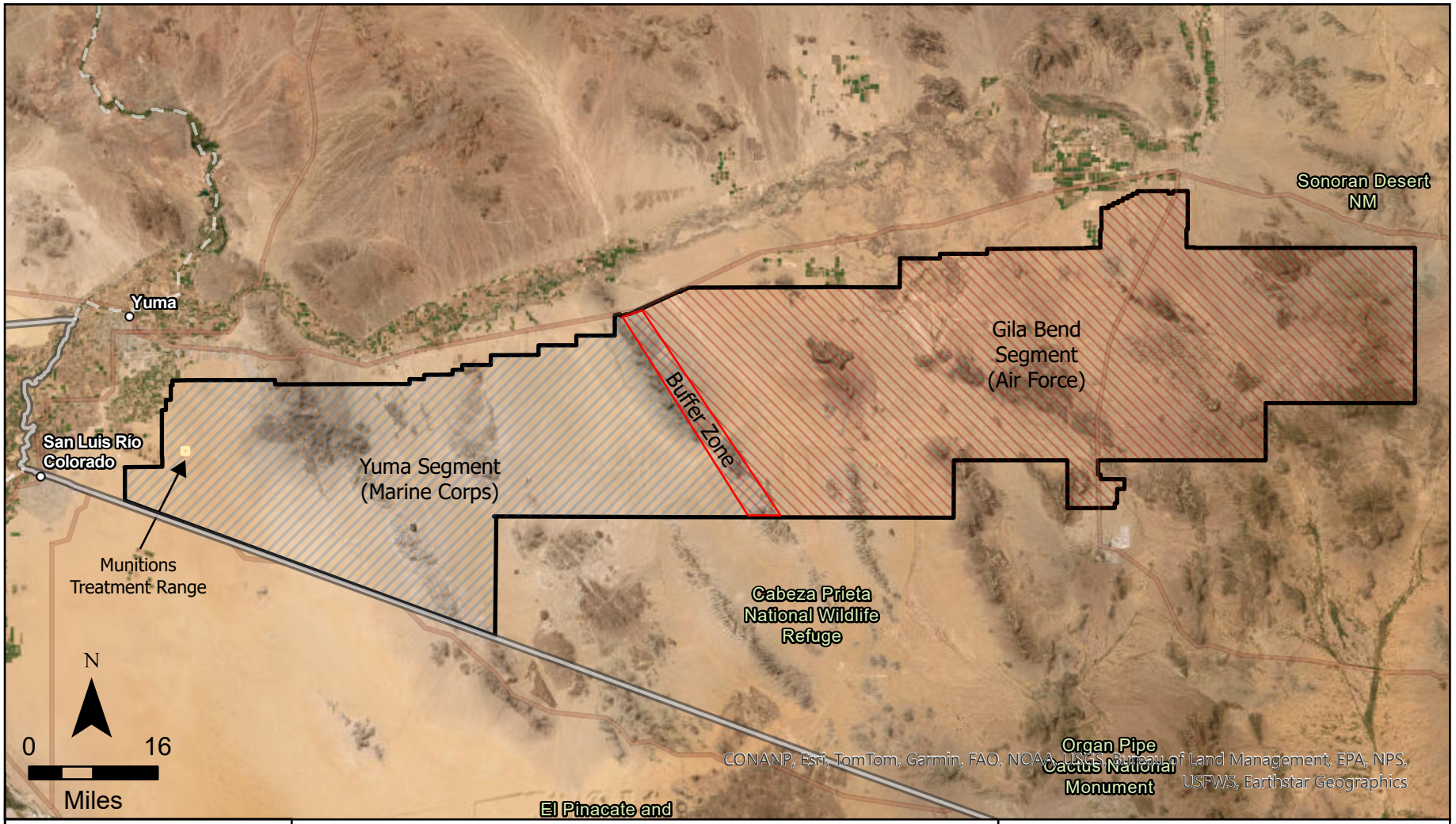

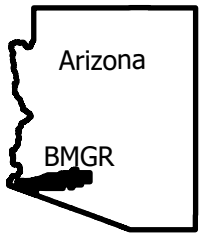

Munitions Treatment Range

Yuma Segment (Marine Corps)

Gila Bend Segment (Air Force)

Buffer Zone

BMGR Boundary

Figure 1
Area Location Map
Barry M. Goldwater Range

Figure 2: MTR Site Location Map

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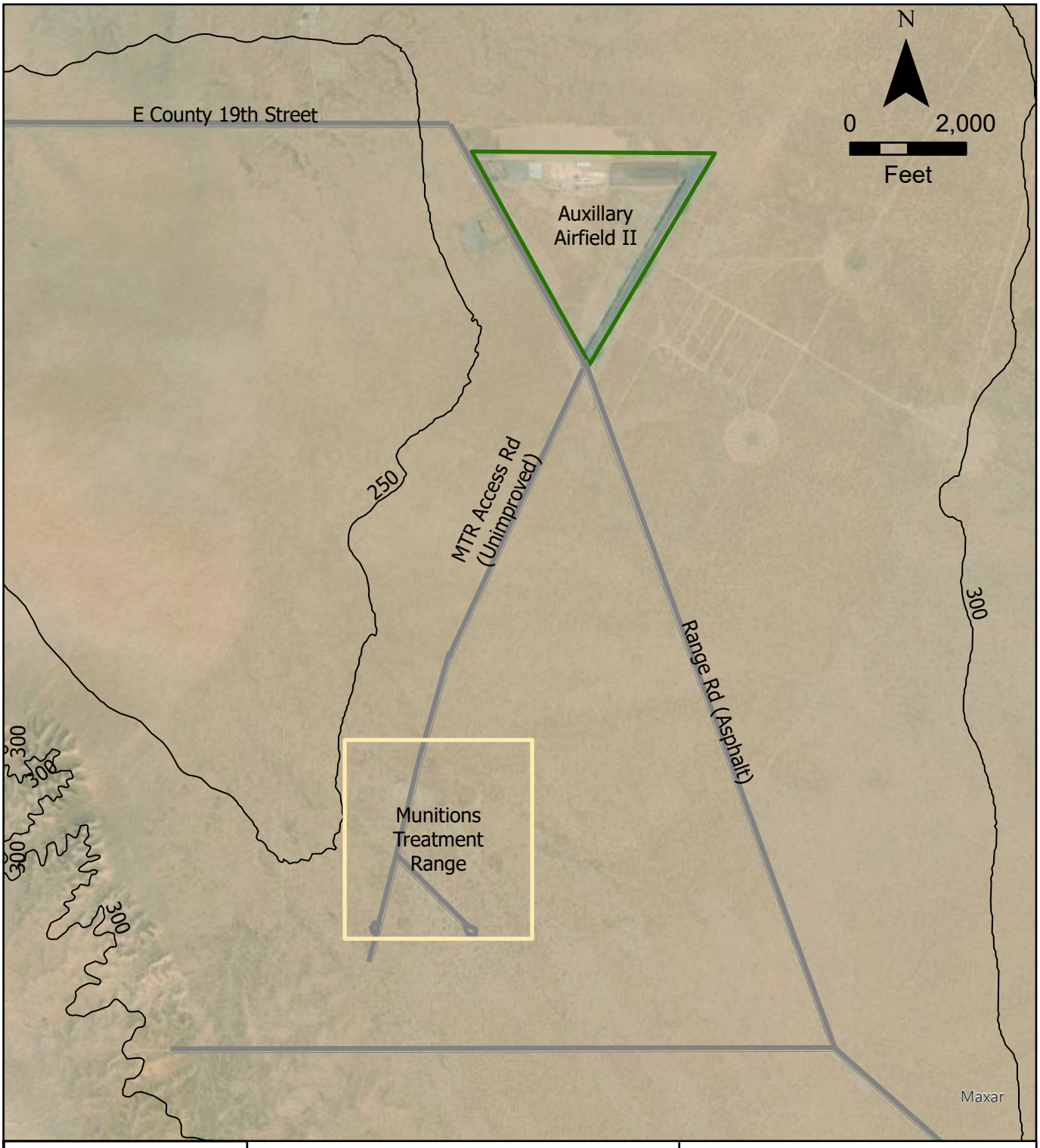

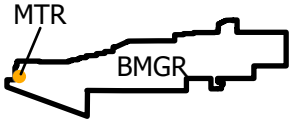

Munitions Treatment Range

Ground Elevation (feet)

Roads

Auxillary Airfield II

Figure 2
MTR Site Location Map
Barry M. Goldwater Range

Attachment 1: Standard Operating Procedures

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SOP 01

SAMPLE CUSTODY

1.0 Objective

Due to the evidentiary nature of samples collected during environmental investigations, possession must be traceable from the time the samples are collected until their derived data are introduced as evidence in legal proceedings. To maintain and document sample possession, sample custody procedures are followed. All paperwork associated with the sample custody procedures will be retained with the contractors project files.

Note: This standard operating procedure (SOP) is intended to present basic sample custody requirements, along with common options. Specific sample custody requirements should be presented in the project-specific Sampling and Analysis Plan (SAP).

2.0 Background

2.1 Definitions

Sample – sample is material to be analyzed that is contained in single or multiple containers representing a unique sample identification number.

Sample Custody – A sample is under custody if:

1. It is in your possession
2. It is in your view, after being in your possession
3. It was in your possession and you locked it up
4. It is in a designated secure area

Chain-of-Custody Record – A chain-of-custody record is a form used to document the transfer of custody of samples from one individual to another.

Custody Seal – A custody seal is a tape-like seal that is part of the chain-of-custody process and is used to detect tampering with samples after they have been packed for shipping. A custody seal is placed on a filled and lidded sample container or a closed and sealed sample cooler. Some projects require each sample container to include a custody seal (if a sample cooler shows tampering with the custody seal, that cooler is flagged).

Sample Label – A sample label is an adhesive label placed on each sample containers to designate a sample identification number and other sampling information.

Sample Tag – A sample tag is attached with string to a sample container to designate a sample identification number and other sampling information. Tags may be used when it is not feasible to place adhesive labels on the container (e.g., in the case of small sampling tubes).

3.0 Responsibilities

Sampler – The sampler is personally responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

Field Team Leader – The field team leader (FTL) is responsible for ensuring that strict chain-of-custody procedures are maintained during all sampling events. The FTL is also responsible for coordinating with the subcontractor laboratory to ensure that adequate information is recorded on custody records. The FTL determines whether proper custody procedures were followed during fieldwork and decides if additional samples are required.

Field Sample Custodian – The field sample custodian, when designated by the FTL, is responsible for accepting custody of samples from the sampler(s) and properly packing and shipping the samples to the laboratory assigned to do the analyses. A field sample custodian is typically designated only for large and complex field efforts.

4.0 Required Supplies

- Chain-of-custody forms
- Sample labels
- Custody seals
- Clear tape

5.0 Procedures

5.1 Chain-of-Custody Record

This procedure establishes a method for maintaining custody of samples through use of a chain-of-custody record. This procedure will be followed for all samples collected or split samples accepted.

Field Custody

1. Collect only the number of samples needed to represent the media being sampled. If a project specific SAP is not available, determine the quantity and types of samples and sample locations prior to the actual fieldwork (refer to the appropriate governing agency for requirements [Arizona Department of Environmental Quality (ADEQ)]). As few people as possible should handle samples.
2. Complete sample labels or tags for each sample using indelible black or blue ink (or waterproof ink as appropriate). To reduce the potential for human error in the field, pre-printed labels are preferred, especially when sampling at a project site requiring a high number of sample containers..
3. Maintain personal custody of the samples (in your possession) at all times until custody is transferred for sample shipment or directly to the analytical laboratory.

Transfer of Custody and Shipment

1. Complete a chain-of-custody record for all samples. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the sample custodian in the appropriate laboratory. Duplicate information included on the chain-of-custody form in a project specific logbook or form. The process of duplication will assist in report preparation following the sampling event.

    - The date/time will be the same for both signatures when custody is transferred directly to another person. When samples are shipped via common carrier (e.g., Federal Express), the date/time will not be the same for both signatures. Common carriers are not required to sign the chain-of-custody record.
    - In all cases, it must be readily apparent that the person who received custody is the same person who relinquished custody to the next custodian.
    - Record a digital photograph of the completed chain-of-custody form for the project file and report preparation. Upload or e-mail the chain-of-custody photograph to the Project Manager or FTL as soon as possible.
    - If samples are left unattended or a person refuses to sign, this must be documented and explained on the chain-of custody record.

Note: If a field sample custodian has been designated, he/she may initiate the chain-of-custody record, sign, and date as the relinquisher. The individual sampler(s) must sign in the appropriate block, but does (do) not need to sign and date as a relinquisher.

2. Package samples properly for shipment and dispatch to the appropriate laboratory for analysis. The sample cooler should be packed with ice stored in Ziploc bags, to fill all remaining space. Each shipment must be accompanied by a separate chain-of-custody form sealed within a Ziploc bag and taped to the inside lid of the sample cooler record. If a shipment consists of multiple coolers, samples in the coolers may be recorded on a single chain-of-custody, with each cooler containing a chain-of-custody form as described in the previous sentence..
3. The original record will accompany the shipment, and the copies will be retained by the FTL and, if applicable, distributed to the appropriate sample coordinators. Freight bills will also be retained by the FTL as part of the permanent documentation. The shipping number from the freight bill shall be recorded on the applicable chain-of-custody record.

Procedure for Completing Chain-of-Custody Record

The following procedure is to be used to fill out the chain-of-custody record. The record provided herein is an example chain-of custody record. If another type of custody record (i.e., provided by the EPA contract laboratory program or a subcontract laboratory) is used to track the custody of samples, the custody record should be filled out in its entirety.

1. Record project number.
2. Record FTL for the project.
3. Record the name and address of the laboratory to which samples are being shipped.
4. Enter the project name/location or code number.
5. Record sample location number.
6. Note preservative added to the sample.
7. Record sample number.
8. Note preservatives added to the sample.
9. Note media type (matrix) of the sample.
10. Note sample type (grab or composite).
11. Enter date of sample collection.
12. Enter time of sample collection.
13. When required by the client, enter the names or initials of the samplers next to the sample location number of the sample they collected.
14. List parameters for analysis and the number of containers submitted for each analysis.
15. Enter matrix spike/matrix spike duplicate (MS/MSD) if sample is for laboratory quality control or other remarks (e.g., sample depth).
16. Sign the chain-of-custody record(s) in the space provided. All samplers must sign each record.
17. Review and fill out applicable areas as needed.
18. If sample tags are used, record the sample tag number in the “Remarks” column.
19. The originator checks information entered in Items 1 through 16 and then signs the top left “Relinquished by” box, prints his/her name, and enters the current date and time.
20. Send the complete chain of custody with the samples to the laboratory; Retain additional copies for the project file or distribute as required to the appropriate sample coordinators.
21. The laboratory sample custodian receiving the sample shipment checks the sample label information against the chain-of-custody record. Sample condition is checked and anything unusual is noted under “Remarks” on the chain-of custody record. The laboratory custodian receiving custody signs in the adjacent “Received by” box and keeps the copy.

5.2 Sample Labels and Tags

Unless the client directs otherwise, sample labels or tags will be used for all samples collected or accepted.

1. Complete on label or tag with the information required by the client for each sample container collected. A typical label or tag would be completed as follows:
   - Record the project code (i.e., project or task number).
   - Enter the station number (sample number) if applicable.
   - Record the date to indicate the month, day, and year of sample collection.
   - Enter the time (24 hour time format) of sample collection (3 pm is equivalent to 1500, whereas 3 am is equivalent to 0300).
   - Place a check to indicate composite of grab sample.
   - Record the station (sample) location.
   - Sign in the space provided.
   - Place a check next to 'yes" or "no" to indicate if a preservative was added.
   - Place a check under "Analyses" next to the parameters for which the sample is to be analyzed. If the desired analysis is not listed, write it in the empty slot. **Note**: Do not write in the box for "laboratory sample number."
   - Place or write additional relevant information under "Remarks."

2. Place adhesive labels directly on the sample containers. Place clear tape over the label to protect from moisture and to preserve the information on the label.
3. Double –check that the information recorded on the sample tag is consistent with the information recorded on the chain-of-custody. Sample labels should be checked in the field by at least two members of the sampling team.

5.3 Sample Shipping

The standard operating procedure listed below defines the requirements for packaging and shipping environmental samples.

- SOP 02, Packaging and Shipping Environmental Samples

SOP 2

PACKAGING AND SHIPPING ENVIRONMENTAL SAMPLES

1.0 Packaging and Shipping of All samples

This standard operating procedure (SOP) applies to the packaging and shipping of all environmental samples. If the sample is preserved or radioactive, the following sections may also be applicable.

Section 2.0-Packaging and Shipping Samples Preserved with Sodium Hydroxide
Section 3.0-Packaging and Shipping Samples Preserved with Hydrochloric Acid
Section 4.0-Packaging and Shipping Samples Preserved with Nitric Acid
Section 5.0-Packaging and Shipping Samples Preserved with Sulfuric Acid
Section 6.0-Packaging and Shipping Limited-Quantity Radioactive Samples

1.1 Objective

The objective of this SOP is to outline the requirements for the packaging and shipment of environmental samples. Additionally, Sections 2.0 through 6.0 outline requirements for the packaging and shipping of regulated environmental samples under the Department of Transportation (DOT) Hazardous Materials Regulations, the International Air Transportation Association (IATA), and International Civil Aviation Organization (ICAO) Dangerous Goods Regulations for shipment by air and applies only to domestic shipment (including data loggers and self-contained breathing apparatus (SCBAs) or bulk chemicals that are regulated under the DOT, IATA, and ICAO.

1.2 Background

1.2.1 Definitions

Environmental Sample- An aliquot of air, water, plant material, sediment, or oil that represents the contamination levels on a site. Samples of potential contaminants sources, like tanks, lagoons, or non aqueous phase liquids are normally not “environmental” for this purpose. This procedure applies only to environmental samples that contain less than reportable quantities for any foreseeable hazardous constituents according to DOT regulations promulgated in 49 CFR-Part 172.101 Appendix A.

Custody Seal- A custody seal is a narrow adhesive-backed seal that is applied to individual sample containers and/or the container (i.e., cooler) before offsite shipment. Custody seals are used to demonstrate that sample integrity has not been compromised during transportation from the field to analytical laboratory.

Inside Container- The container, normally made of glass or plastic, that actually contacts the shipped material. Its purpose is to keep the sample from mixing with the ambient environment.

Outside Container- The container, normally made of metal or plastic, that the transporter contacts. Its purpose is to protect the inside container.

Secondary Containment- The outside container provides secondary containment if the inside container breaks (i.e., plastic overpackaging if liquid sample is collected in glass.)

Excepted Quantity- Excepted quantities are limits to the mass or volume of a hazardous material in the inside and outside container below which DOT, IATA, or ICAO regulations do not apply. The excepted quantity limits are very low. Most regulated shipments will be made under limited quantity.

Limited Quantity- Limited quantity is the maximum amount of a hazardous material below which there are specific labeling or packaging exceptions.

Qualified Shipper- A qualified shipper is a person who has been adequately trained to perform the functions of shipping hazardous materials.

1.2.2 Discussion

Proper packaging and shipping is necessary to ensure the protection and the integrity of environmental samples shipped for analysis. These shipments are potentially subject to regulations published by DOT, IATA, or ICAO. Failure to abide by these rules places the risk of serious fines. The analytical holding for the samples must not be exceeded. The samples should be packed in time to be shipped for overnight delivery. Make arrangements with the laboratory before sending samples for weekend delivery.

1.2.3 Associated Procedures

- SOP 1-1, Sample Custody

1.3 Required Equipment

- Coolers with return address of the appropriate office
- Heavy-duty plastic garbage bags
- Plastic sip-type bags, small and large
- Clear tape
- Nylon reinforced strapping tape
- Duct tape
- Vermiculite (or equivalent nonflammable material that is inert and absorbent)
- Bubble wrap (optional)
- Ice
- Custody seals
- Completed chain-of-custody record or contact laboratory program (CLP) custody records, if applicable
- Completed bill of lading

- "This End Up" and directional arrow labels
- Check for any client-specific or laboratory requirements related to the use of absorbent packaging materials.

1.4 Packaging Environmental Samples

The following steps must be followed when packing sample bottles and jars for shipment:

1. Verify the samples undergoing shipment meet the definition of "environmental sample" and are not a hazardous material as defined by DOT. Professional judgment and/or consultation with qualified persons such as the appropriate health and safety coordinator or the health and safety manager should be observed.

2. Select a sturdy cooler in good repair. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler. Line the cooler with a large heavy-duty plastic bag.

3. Be sure that the caps on all bottles are tight (will not leak); check to see that labels and chain-of-custody records are completed properly (SOP 1-1, Sample Custody).

4. Place all bottles in separate and appropriately sized plastic zip-top bags and close the bags. Up to three VOA vials may be packed in one bag. Binding the vials together with a rubber band on the outside of the bag, or separating them so that they do not contact each other, will reduce the risk of breakage. Bottles may be wrapped in bubble wrap. Optionally, place three to six VOA vials in a quart metal can and then fill the can with vermiculite of equivalent. Note: Trip blanks must be included in coolers containing VOA samples.

5. Place 2 to 4 inches of vermiculite (or equivalent) into a cooler that has been lined with a garbage bag, and then place the bottles and cans in the bag with sufficient space to allow for the additional packing material between the bottles and cans. It is preferable to place glass sample bottles and jars into the cooler vertically. Glass containers are less likely to break when packed vertically rather than horizontally.

6. While placing sample containers into the cooler, conduct an inventory of the contents of the shipping cooler against the chain-of-custody record. The chain-of-custody with the cooler should reflect those samples within the cooler.

7. Put ice in large zip-top bags (double bagging the zip-tops is preferred) and properly seal. Place the ice bags on top of and/or between the samples. Several bags are required (dependent on outdoor temperature, staging

time, etc.) to maintain the cooler temperature at approximately 4° Celsius (C) if the analytical method requires cooling. Fill all remaining space between the bottles or cans with packing material. Securely fasten the top of the large garbage bag with fiber or duct tape.

8. Place the completed chain-of-custody record for the laboratory into a plastic zip-top bag, seal the bag, tape the bag to the inner side of the cooler lid and close the cooler.

9. The cooler lid shall be secured with nylon reinforced strapping tape by wrapping each end of the cooler a minimum of two times. Attach a completed chain-of-custody seal across the opening of the cooler on opposite sides. The custody seals should be affixed to the cooler with half of the seal on the strapping tape so that the cooler cannot be opened without breaking the seal. Complete two more wraps around with fiber tape and place clear tape over the custody seals.

10. The shipping container lid must be marked “THIS END UP” and arrow labels that indicate the proper upward position of the container should be affixed to the cooler. A label containing the name and address of the shipper shall be placed on the outside of the container. Labels used in the shipment of hazardous materials (such as Cargo Only Air Craft, Flammable Solids, etc.) are not permitted on the outside of containers used to transport environmental samples and shall not be used. The name and address of the laboratory shall be placed on the container, or when shipping by common courier, the bill of lading shall be completed and attached to the lid of the shipping container.

2.0 Packaging and Shipping Samples Preserved with Sodium Hydroxide

2.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 2-1
Excepted Quantities of Sodium Hydroxide Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
NaOH 30%	>12	0.08%	0	0.25	0.5	1	2

2.2 Responsibility

It is the responsibility of the qualified shipper to determine the amount of preservative in each sample so that accurate determination of quantities can be made.

2.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

- Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test
- Inner packings may consist of glass or plastic jars no larger than 1 pint
- Survey documentation (if shipping from DOE or radiological sites)
- Class 8 corrosive labels
- Orientation labels
- Consignor/consignee labels

2.4 Packaging Samples Preserved with Sodium Hydroxide

The following steps are to be followed when packaging NaOH limited-quantity samples shipments.

- All openings in sample containers will be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.

- All sample containers will properly labeled and secured with waterproof tape prior to sampling.

- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.
- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

3.0 Packaging and Shipping Samples Preserves with Hydrochloric Acid

3.1 Containers

The inner packaging container (and amount of preservative) that may be used for these shipments includes:

Table 3-1
Excepted Quantities of Hydrochloric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container		
	pH	Conc.	40ml	125 ml	250ml
HCl 2N	<1.96	0.04%	0 .2	0.5	1

3.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

3.3 Packaging Samples Preserved with Hydrochloric Acid

The following steps are to be followed when packaging limited-quantity sample shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container (40-ml VOA vials) in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

4.0 Packaging and Shipping Samples Preserved with Nitric Acid

4.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 4-1
Excepted Quantities of Nitric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
HNO_3 6N	<1.62	0.15%	0	2	4	5	8

4.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

4.3 Packaging Samples Preserved with Nitric Acid

The following steps are to be followed when packaging limited-quantity samples shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

5.0 Packaging and Shipping Samples Preserved with Sulfuric Acid

5.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 5-1
Excepted Quantities of Sulfuric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
H_2SO_4 37N	<1.15	0.35%	0.1	.25	0.5	1	2

5.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

5.3 Packaging Samples Preserved with Sulfuric Acid

The following steps are to be followed when packaging limited-quantity samples shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

6.0 Packaging and Shipping Limited-Quantity Radioactivity Samples

6.1 Containers

The inner packaging container that may be used for these shipments includes:

- Any size sample container

6.2 Description/Responsibilities

- The qualified shipper will determine that the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT.
- The qualified shipper will ship all samples that meet the Class 7 definition of radioactive materials and meet the activity requirements specified in Table 7 of 49 CFR 173.425, as Radioactive Materials in Limited Quantity. The qualified shipper will verify that all packages and their contents meet the requirements of 49 CFR 173.421, *Limited Quantities of Radioactive Materials.*
- The packaging used for shipping will meet the general requirements for packaging and packages specified in 49 CFR 173.24 and the general design requirements provided by 173.410. These standards state that a package must be capable of withstanding the effect of any acceleration, vibration, or resonance that may arise under normal condition of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole and without loosening or unintentionally releasing the nuts, bolts or other securing devices even after repeated use.
- If the shipment is from a DOE facility, radiological screenings will be completed on all samples taken. The qualified shipper will review the results of each screening (alpha, beta, and gamma speciation). Samples will not be shipped offsite until the radiological screening has been performed.
- The total activity for each package will not exceed the relevant limits listed in Table 7 of 49 CFR 173.425. The A_2 value of the material will be calculated based on all radionuclides found during previous investigations (if any) in the area from which the samples are derived. The A_2 values to be used will be the most restrictive of all potential radionuclides as listed in 49 CFR 173.435.
- The radiation level at any point on the external surface of the package bearing the sample(s) will not exceed 0.005 millisievert/hour (mSv/Hr); which is equivalent to 0.5 millirem/hour (mrem/Hr). These will be verified by dose and activity monitoring prior to shipment of the package.
- The removable radioactive surface contamination of the external surface of the package will not exceed the limits specified in 49 CFR 173.443(a).

- The qualified shipper will verify that the outside of the inner packaging is marked “Radioactive”.
- The qualified shipper will verify that the excepted packages prepared for shipment under the provisions of 49 CFR 173.421 have a notice enclosed, or shown on the outside of the package, that reads, **“This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910.”**

6.3 Additional Required Equipment

The following equipment is needed in addition to the required listed in Section 1.3.

- Survey documentation/radiation screening results (if shipping from DOE or radiological sites)
- Orientation labels
- Excepted quantities level
- Consignor/consignee

6.4 Packaging of Limited-Quantity Radioactive Samples

The following steps are to be followed when packaging limited-quantity sample shipment.

- The cooler is to be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.
- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector’s initials
  - Preservative

- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.
- Place the bubble-wrapped container into a zip-type bag, removing trapped air.

- Glass containers inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature (4^0 C).
- Seal the garbage bag by tying or taping.
- Place a label marked Radioactive on the outside of the sealed bag.
- Enclose a notice that includes the name of the consignor or consignee and the following statement: **"This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910."**
- Note that both DOT and IATA apply different limits to the quantity in the inside packing and in the outside packing
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody form.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler/package.
- Affix a completed Excepted Quantities label to the side of the cooler/package.
- Secure any marking and labels to the surface of the cooler with clear water proof tape to prevent accidental removal during shipment.

7.0 References

U.S. Environmental Protection Agency, *Sampler's Guide to the Contract Laboratory Program*, EPA/540/P-90/106, December 1990

U.S. Environmental Protection Agency, Region IV, *Standard Operating Procedures and Quality Assurance Manual*, February 1991.

U.S. Environmental Protection Agency Rule, 40 CFR 136

Appendix A

Dangerous Goods and Hazardous Materials Inspection Checklist For Shipping Limited-Quantity

Sample Packaging

Yes	No	N/A	
☐	☐	☐	The VOA vials are wrapped in bubble wrap and placed inside a zip-type bag.
☐	☐	☐	The VOA vials are placed into a polyethylene bottle, filled with vermiculite, and tightly sealed.
☐	☐	☐	The drain plug is taped inside and outside to ensure control of interior contents.
☐	☐	☐	The samples have been placed inside garbage bags with sufficient bags of ice to preserve samples at 4° C.
☐	☐	☐	The cooler weighs less than the 66-pounds limit for limited-quantity shipment.
☐	☐	☐	The garbage bag has been sealed with tape (or tied) to prevent movement during shipment.
☐	☐	☐	The chain-of-custody record has been secured to the interior of the cooler lid.
☐	☐	☐	The cooler lid and sides have been taped to ensure a seal.
☐	☐	☐	The custody seals have been placed on both the front and back hinges of the cooler, using waterproof tape.

Air Waybill Completion

Yes	No	N/A	
☐	☐	☐	The shipper's name, company, and address; the account number, date, internal billing reference number; and the telephone number have been included.
☐	☐	☐	The recipient's name and company along with a telephone number have been included.
☐	☐	☐	The number of packages and their weights have been filled out.
☐	☐	☐	The Name, Place and Date, Signature, and Emergency Telephone Number appears at the bottom of the FedEx Airbill.
☐	☐	☐	The Emergency Contact Information at the bottom of Airbill is truly someone who can respond any time of the day or night.

Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Sub Risk	Quantity	Packing Instruction	Authorization
Hydrochloric Acid Solution	8	UN1789	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.

Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Sub Risk	Quantity	Packing Instruction	Authorization
Nitric Acid Solution (with less than 20%)	8	UN2031	II		1 plastic box x 0.5 L	Y807	Ltd. Qty.
Sodium Hydroxide Solution	8	UN1824	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.
Sulfuric Acid Solution	8	UN2796	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.

Sample Cooler Labeling

Yes	No	N/A	
☐	☐	☐	The proper shipping name, UN number, and Ltd. Qty. appears on the shipping container
☐	☐	☐	The corresponding hazard labels are affixed on the shipping container; the labels are not obscured by tape.
☐	☐	☐	The name and address of the shipper and receiver appear on the top and side of the shipping container.
☐	☐	☐	The air waybill is attached to the top of the shipping container.
☐	☐	☐	Up arrows have been attached to opposite sides of the shipping container.
☐	☐	☐	Packaging tape does not obscure markings or labeling.

SOP 03

FIELD LOGBOOK CONTENT AND CONTROL

1.0 Objective

The objective of this standard operating procedure (SOP) is to set the criteria for content entry and form of field logbooks. Field logbooks are an essential tool to document field activities for historical and legal purposes, as well as to include in the contractor project file.

2.0 Background

2.1 Definitions

Biota- The flora and Fauna of a region

Magnetic Declination Corrections – Compass adjustments to correct for the angle between magnetic north and geographical meridians.

2.2 Discussion

Information recorded in field logbooks includes field team names, observations, data, calculations, date/time, weather, and description of the data collection activity, methods, instruments, and results. Additionally, the logbook may contain deviations from plans and descriptions of wastes, biota, geologic material and site features including sketches, maps or drawings as appropriate.

3.0 Responsibilities

Field Team Leader – The field team leader (FTL) is responsible for ensuring that the format and content of data entries are in accordance with this procedure.

Site Personnel- All employees who make entries in field logbooks during onsite activities are required to read this procedure prior to engaging in this activity. The FTL will assign field logbooks to site personnel who will be responsible for their care and maintenance. Site personnel will return field logbooks to the records file at the end of the assignment.

4.0 Required Supplies

- Site-specific plans
- Field Notebook
- Indelible black or blue ink pen
- Ruler/Scale

5.0 Procedures

5.1 Preparation

In addition to this SOP, site personnel responsible for maintaining logbooks must be familiar with procedures applicable to the field activity being performed. These procedures should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation. These procedures should be located at the field office.

Field logbooks shall be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the logbook. Prior to use in the field, the following information shall be recorded on the cover of the logbook:

- Field logbook Project Number/Document control number
- Activity (if the logbook is to be activity-specific) and location
- Name of project contact and phone number(s)
- Start date
- In specific cases, special logbooks may be required (e.g. waterproof paper for stormwater monitoring etc.)

5.2 Operation

Requirements that must be followed when using a logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the logbook. If data collection forms are specified by an activity-specific plan, this information need not be duplicated in the logbook. However, any forms used to record site information must be referenced in the logbook.
- Do not start a new page until the current page is full or has been marked with a single diagonal line and initialed by the author so that additional entries cannot be made. Use both sides of each page.
- Do not erase or blot out any entry at any time. Indicate any deletion by a single line through the material to be deleted. Initial and date each deletion. Take care to not obliterate what was written previously.
- Do not remove any pages from the book.

Specific requirements for field logbook entries include:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial and date all changes (changes are to be crossed out with a single line, initialed, and dated).
- Multiple authors must sign out the logbook by inserting the following:
- Date and Time

- Name of individual making entry
- Names of field team and other persons onsite
- Description of activity being conducted including installation, site, or location (i.e., well, boring, sampling location number) if appropriate.
- Weather conditions (i.e. Temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
- Level of personal protection to be used
- Required calibration information
- Serial/tracking numbers on documentation (e.g. carrier air bills)

Entries into the field logbook shall be preceded with the time (written in 24 hour time format) of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being performed. All measurements made and samples collected must be recorded unless they are documented by automatic methods (E.G. data logger) or on a separate form required by an operating procedure. In these cases, the logbook must reference the automatic data record or form.

At each location where a sample is collected or an observation or measurement made, a detailed description of the location of the location is required. Use a compass (include a reference to magnetic declination corrections), scale, or nearby survey markers, as appropriate. A sketch of the location location may be warranted. All maps or sketches made in the logbook should have descriptions of the features shown and a direction indicator. It is preferred that maps and sketches be oriented so that north is toward the top of the page. Maps, sketches, figures, or data that will not fit on a logbook page should be referenced and attached to the logbook to prevent separation.

Other events and observations that should be recorded include:

- Changes in weather that impact field activities.
- Deviations from procedures outlined in any SOPs or governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personal protection equipment.
- Health and safety related issues.
- Emergencies.
- Site visitors.

5.3 Post-Operation

To guard against loss of data due to damage or disappearance of logbooks, completed pages shall be scanned and saved in the electronic project file at the earliest opportunity. For longer duration sampling events (weeks to months), this action is preferred at the end of each work week. Duplication of logbook documentation is crucial in maintaining official record of on-site technical work. In some cases, the contractor clients may request logbook records of technical work

performed by the contractor. It is the contractor's responsibility to maintain official records of all contract work, not only for company files, but for client files. Other field records shall be scanned and saved regularly and as promptly as possible to the electronic project file.

At the conclusion of each activity or phase of site work, the individual responsible for the logbook will ensure that all entries have been appropriately signed and dated, and that corrections were made properly (single lines drawn through incorrect information, then initialed and dated). The completed logbook shall be submitted to the records file.

6.0 Restrictions/ Limitations

Field logbooks constitute the official record of onsite technical work, investigations, and data collection activities. Their use, control and ownership are restricted to activities pertaining to specific field operations carried out by personnel and their subcontractors. They are documents that may be used in court to indicate dates, personnel, procedures, and techniques employed during site activities. Entries made in these logbooks should be factual, clear, precise, and non-subjective. Field logbooks, and entries within, are not to be used for personal use.

SOP 4

FIELD SAMPLE NUMBERING

1.0 Purpose

This Standard Operating Procedure (SOP) establishes the guidelines and procedures for sample numbering. Sample numbering is required to identify, track, and trace samples from the time of collection until the time of disposal. Additional specific procedures and requirements are provided in the Tier II Uniform Federal Programs Quality Assurance Project Plan (UFP-QAPP).

2.0 Definitions/Materials

Decision Unit (DU) – DU is defined as the smallest volume of soil collected over an area for the purposes of decision-making

Sample – sample is material to be analyzed that is contained in single or multiple containers representing a unique sample identification number.

Sample Label – A sample label is an adhesive label placed on each sample containers to designate a sample identification number and other sampling information.

Sample Number or Sample Identification (Sample ID) – Sample ID is a unique alphanumeric identification assigned to each and all physical samples collected as part of any given project.

Sample Tag – A sample tag is attached with string to a sample container to designate a sample identification number and other sampling information. Tags may be used when it is not feasible to place adhesive labels on the container (e.g., in the case of small sampling tubes).

3.0 Responsibility

3.1 Field Team Lead

The Field Team Lead is responsible for ensuring that all sample collection and numbering activities are conducted and documented in accordance with this SOP and any other applicable procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control. The Field Team Lead is also responsible for the implementation of corrective action (i.e., retraining personnel and additional review of SOPs) if case of deviation from the approved procedure.

3.2 Project Chemist

The Project Chemist is responsible for issuing variances to sample labeling requirements and issuing nonconformance approvals if problems occur.

3.3 Field Staff

All staff are responsible for reporting deviations from this SOP to the Field Team Lead.

4.0 Required Supplies

- Chain-of-custody forms
- Sample labels
- Custody seals
- Clear tape

5.0 Procedures

This section contains the procedures for sample numbering and labeling. Sample numbering is required to provide a means by which samples can be identified, tracked, and traced from the time of collection until the time of disposal. The details within this SOP should be used in conjunction with the UFP-QAPP, which provides the following information**:**

- Sample collection objective
- Numbers, types, and locations of samples to be collected.
- Location identifiers (location IDs) for planned sample points
- Date and time of collection
- Sampler's initials
- Any additional sample numbering requirements or procedures beyond those covered in this SOP, as necessary.

6.0 Sample Numbering

- The sample numbers should be as simple and preferably as short as possible; however, they should also be compatible with the laboratory analytical tracking system and the data management system to be used for the project sample data.
- A unique sample number will be assigned in the field to each sample to be submitted for analysis.
- The sample numbers will be assigned sequentially (e.g. DU 1-ISM-01-1 through DU 1-ISM-01-10) as the samples are collected. Both primary (non-QC) and QC samples will be assigned sample numbers with the same prefix so that the laboratory will be unable to distinguish between the QC and non-QC samples.

- The sample number will be recorded, using indelible ink, directly on the sample label attached to each sample per SOPs 08 and 09.

- The sample number must also be recorded on the Field logbook, sample bag or jar, and Chain-of-Custody Form.

- It is recommended that one person (either the Project Chemist, Field Team Lead, or other designee) be responsible for issuing sample numbers to field sampling personnel and for soil samples, ensuring that the sample sequence numbers are applied to samples in the sequence in which they are collected.

- It is also recommended the Field Team Lead or designee be responsible for keeping a master sample log listing in the field logbook, including the sample numbers and a brief description of the samples collected.

7.0 Chain of Custody Procedure

This will be done in accordance with the procedure outlined in SOP 8. Samples are in custody if they are in the custodian's view, stored in a secure place with restricted access, or placed in a container secured with custody seals. Samples will not be outside of designated personnel's custody unless the samples have been transferred to a secure area (i.e., locked up and custody sealed) or transferred to the laboratory. If the samples cannot be placed in a secure area, a field team member will always physically remain with the samples (e.g., during breaks or mealtimes). A COC record will be signed by each person who has custody of the samples and will always accompany the samples. Copies of the COC form will be included in the laboratory and QA/QC Reports.

The COC will either be electronic or a hard copy with information on:

- Site
- Sample Identification completed using a seven-digit unique designation according to the following:
    - A three-character designation of the DU (i.e. DU1)
    - A two- or three-character designation for type of sample (i.e. ISM or SS [soil sample])
    - A two-character designation for primary, duplicate or QC sample (i.e. 01 for primary, 03 for duplicate, 05 for a source blank and 07 for an equipment blank.
    - A one-character designation for consecutive samples from the same location (i.e. 1 for the first sample within a DU)
    - Each character will be separated by a dash (i.e. DU 1-ISM-01-1).
- Date and Time of Sample Collection
- Sample Type
- Number of Samples
- Field Supervisor's Name and Team Members Responsible for Collection of the Listed Samples
- Number of Containers (Coolers) Shipped
- Requested Analyses for Each Sample
- Name, Date, Time, and Signature of the Relinquishing and Receiving Personnel (commercial shipment carriers not included)

7.1 Sample Labels and Tags

Unless the client directs otherwise, sample labels or tags will be used for all samples collected or accepted.

a. Complete on label or tag with the information required by the client for each sample container collected. A typical label or tag would be completed as follows:
   - Record the project code (i.e., project or task number).
   - Enter the station number (sample number) if applicable.
   - Record the date to indicate the month, day, and year of sample collection.
   - Enter the time (24-hour time format) of sample collection (3 pm is equivalent to 1500, whereas 3 am is equivalent to 0300).
   - Place a check to indicate composite of grab sample.
   - Record the station (sample) location.
   - Sign in the space provided.
   - Place a check next to 'yes" or "no" to indicate if a preservative was added.
   - Place a check under "Analyses" next to the parameters for which the sample is to be analyzed. If the desired analysis is not listed, write it in the empty slot. **Note**: Do not write in the box for "laboratory sample number."
   - Place or write additional relevant information under "Remarks."

b. Place adhesive labels directly on the sample containers. Place clear tape over the label to protect from moisture and to preserve the information on the label.

c. Double - check that the information recorded on the sample tag is consistent with the information recorded on the chain-of-custody. Sample labels should be checked in the field by at least two members of the sampling team.

SOP 05

DRILLING

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the minimum requirements needed to ensure the contractor employees safely perform drilling operations. Drilling operations are an inherently dangerous activity because they require motorized equipment, the equipment has many moving parts, heavy and awkward components and tools are required, the drill rig may have a large mast, and drilling penetrates the subsurface where potential unknown conditions or hazards may exist. The primary drilling hazard topics covered in this SOP include utility contact prevention, overhead hazards, moving components, and pressurized lines.

2.0 ASSOCIATED STANDARD OPERATING PROCEDURES

The following contractor procedures are associated with drilling activities:

- Drilling – Lithologic Logging
- Drilling – Subsurface Soil Sampling

3.0 RESPONSIBILITIES

Responsible personnel are described below.

3.1 Project Manager

Responsible for ensuring all personnel are following SOPS, that a Competent Person has been assigned, and that oversight is in place and being implemented.

3.2 Competent Person

See Section 4.0 for Key Competent Person responsibilities.

3.3 Site Supervisor and/or Site Safety Officer

Responsible for ensuring preparatory actions are completed before the event, that site personnel are following required SOPs, and performing or assigning the completion of required inspections and safety checks.

3.4 Site Personnel

Site personnel (employees, contractors, subcontractors, etc.) must be aware of their actions and the potential risks associated with them and follow procedures to ensure protection from accidents and injury.

4.0 PROCEDURE

Primary safety procedures for drilling safety are detailed in this section.

4.1 Subsurface Utility Contract Prevention

All possible checks should be made to avoid contacting subsurface utilities. Whenever possible, all available utility locator services should be used to ensure clearance. The following provides a list of primary actions that should be followed to avoid contacting subsurface utilities.

- Understand and follow location-specific regulations and client requirements for identifying, documenting, and avoiding subsurface utilities and other subsurface structures.
- Ensure the property owner is aware of the planned intrusive activities and where they will occur.
- All drilling should occur at a minimum of 5 feet from any known or suspected location of an underground structure or utility.
- Perform site visit to locate/mark drilling locations. Prior to site visit, assess all available information about potential subsurface structures in the immediate work area. Before marking planned drilling locations, walk the site looking for any indications suggesting where subsurface structures or utilities might exist and provide adequate clearance. Indications of potential utilities include trench cut pavement, different aged or color pavement, sagging pavement, etc.). Ensure the planned drilling locations are clearly and accurately marked.
- Contact One-Call utility service notification center and provide notification of plans, request utility mark out, and ensure all applicable utility companies will be notified. Track notification ticket and ensure sufficient time is provided for the process to be performed.
- Utility lines identified in the immediate vicinity of the planned drilling location will be marked using color-coded surveyor paint or other marking methods if paint cannot be used. Utilities are usually identified using standardized color coding using the following colors:
    - RED – Electric power lines
    - YELLOW – Gas, oil, steam, or petroleum, or gaseous materials
    - ORANGE – Communication, alarm or signal lines, cables, or conduit
    - BLUE – Potable water
    - PURPLE – Reclaimed water, irrigation, and slurry lines
    - GREEN – Sewers and drain lines
    - WHITE – Proposed excavation

- Contact property owner, if appropriate, and request utility clearance/mark out if they have that capability or require that action (e.g., military facility dig permit).
- Have geophysical survey performed of all planned drilling locations. Especially in areas that are not covered by the One-Call utility service notification center.
- All markings showing the location of utilities near planned drilling locations should be documented in photos, logbook, and/or drawings to record their identified locations. Markings should be preserved and reapplied to ensure they remain for as long as needed.
- Safety planning documents (e.g., accident prevent plan, Activity Hazard Analysis, etc.) must identify the emergency procedures to be taken should underground utilities be encountered and field personnel will be briefed on those procedures.
- A designated Competent Person will be on site when intrusive activities are being performed.
- If system emergency shut offs exist at the site, their location(s) should be known to key personnel during drilling.
- “No Drill Zones” should be established in areas with known USTs, subsurface utility congestion, and the potential to encounter high risk utilities.
- All planned drilling locations must be cleared manually to the diameter of the drill pipe or auger to a dept of five feet below ground surface (bgs) by hand digging (hand auger, post hole digger, etc.) or vacuum excavation.
- Drilling location that cannot be manually cleared to 5 feet bgs due to technical requirement (e.g., shallow temporary vapor probe installation) or site conditions (i.e., shallow groundwater, refusal due to rocks, ground is too hard, etc.) will require authorization from management to drill those locations. That authorization will include confirming that all possible actions have been taken to attempt to ensure utility contact avoidance.
- If pea gravel or other indications of human activity are encountered during manual boring location clearance or drilling, work should stop, and a determination made as to whether utilities are possibly present. When in doubt, do not drill at that location.
- Personnel are required to immediately report to the Competent Person and site supervisor any utility near miss or utility contact. The Competent Person or site supervisor, as necessary, will notify management, the property owner, and utility owner if a utility is damage.
- If contact with a utility results in an emergency, the procedures put forth in the safety planning documents will be implemented.

4.2 Overhead Hazards

Standard practices should be used, and all possible checks should be made to avoid contacting overhead hazards. The following provides a list of primary actions that should be used to avoid contacting overhead hazards.

- Work activity adjacent to overhead lines shall not be initiated until a survey has been made to ascertain the safe clearance from energized lines.
- Work activity that could affect or be affected by overhead lines shall not be initiated until coordinated with the appropriate utility officials.
- Any overhead wire shall be considered energized unless the person owning such line or operating officials of the electrical utility supplying the line certifies that it is not energized, and it has been visibly grounded and tested.
- Operations adjacent to overhead lines are prohibited unless at least one of the following conditions is satisfied:
    - Power has been shut off and positive means taken to prevent the lines from being energized
    - Equipment or any part of the equipment does not have the capability of coming within the minimum clearance from energized overhead lines as specified in the below minimum clearance requirement table.
    - The equipment has been positioned and blocked to assure no part, including cables, wire rope, components, and attachments, can come within those clearances and a notice of the minimum required clearance has been posted at the operator's position

Minimum Clearance from Energized Overhead Electric Lines

Voltage (nominal, kilovolt, alternating current)	Minimum Clearance Distance
Up to 50	10 feet (3 meters)
51 – 200	15 feet (4.6 meters)
201 – 350	20 feet (6 meters)
351 – 500	25 feet (7.6 meters)
501 – 750	35 feet (10.7 meters)
751 – 1000	45 feet (13.7 meters)
Over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

Note: All dimensions are distances from live part to equipment and components at any potential reach.

Reference: United States Army Corps of Engineers (USACE). 2014. Safety and Health Requirements Manual, EM 385-1-1, Washington, D.C., November 30.

- Overhead utility locations must be marked where heavy equipment or other equipment has the potential for contacting overhead or adjacent utilities.
- Daily site inspections are required to determine where activities will take place and to ensure all adjacent above ground utilities are identified, marked, and/or protected, to prevent contact. Provide updated information to employees in daily safety tailgate meetings.
- Every time, before moving the drill rig, checks should be made to determine if there is a potential to encounter overhead hazards. In many instances, encountered overhead hazards were known but forgotten and a check was not made before movement resulting in damage and/or injury.
- Extreme caution will be taken when raising or lowering the drill mast when in the vicinity of overhead utilities
- Drill rigs should only be moved once the derrick has been lowered. Travel with the drill mast raised is not be permitted.
- When moving a drill rig, a spotter will be used whenever near overhead hazards, nearby structures or equipment, and when visibility is restricted.

4.3 Moving Components

To operate, drill rigs require many moving components and moving components pose many risks. The following identifies potential risks and control measures for dealing with drill rig moving parts.

- All drilling equipment and the drilling area shall be inspected before each shift by a Competent Person.
- All personnel should ensure a safe distance exists between personnel and moving components when drilling. The operator shall verbally alert employees and visually ensure employees are clear from dangerous parts of equipment before starting or engaging equipment.
- Before approaching an operating drill rig, personnel must be established eye contact with the equipment operator.
- Drill crewmembers shall not wear loose clothing, jewelry, or equipment that might become caught in moving machinery. High visibility vests used on drilling rigs, if required, must be of the break-away type. Long hair must be contained so it cannot be caught in moving machinery.
- Drilling equipment shall be equipped with at least two easily accessible emergency shutdown devices (“kill switches”), one for the operator and one for the helper. Both kill switches will be tested each day before beginning drilling.
- All required guarding and safety devices shall be provided, used, and maintained. Ensure all machine guards are in place and functioning correctly.

- Drill rods shall not be run or rotated through rod slipping devices. No more than one (1) foot of drill rod column shall be hoisted above the top of the drill mast.
- Auger Guard: A means shall be provided to guard against employee contact with the auger (e.g. guard around the auger; barricade around the perimeter of the auger; electronic brake activated by a presence-sensing device). If an auger guard is infeasible due to type of drill equipment being used, employees must maintain a safe/clear distance while the auger is rotating. Only when the drill has stopped rotating, the controls returned to the neutral position, and a clear signal has been given by the operator and understood by the helper that it is safe, shall the employee proceed to approach the drill. If an auger guard will not be used, a risk assessment shall be performed by the Competent Person and documented in the accident prevention plan and Activity Hazard Analysis as to why the use of an auger guard is not practical. Identification of additional precautions and/or controls shall be identified to ensure an equal level of safety is accomplished.
- Drill rod tool joints shall not be made up, tightened, or loosened while the rod column is supported by a rod-slipping device.
- Augers shall be cleaned only when the rotating mechanism is in neutral and the auger stopped. Long-handled shovels shall be used to move cutting from the auger.
- Hoists shall be used only for their designed intent and shall not be loaded beyond their rated capacity. When using the hoist, ensure that during the lift or if the lift should fail that individual will not be struck by or caught between the item being moved or lift components should they fail.
- Perform lockout/tagout procedures prior to accessing, disconnecting, or attempting repairs to drill rig moving components.

4.4 Pressurized Lines

The following identifies potential risks and control measures for dealing with pressurized drill rig lines.

- Pressurized equipment and systems shall be inspected, and performance tested before being placed in service and after any repair or modification.
- Safety and relief valves shall be provided on all pressurized equipment and systems.
- Drilling equipment shall be equipped with at least two easily accessible emergency shutdown devices (“kill switches”), one for the operator and one for the helper. Both kill switches will be tested each day before beginning drilling.
- Pressurized manual equipment, subject to whipping or rotation if released, shall be provided with an automatic shut-off or control of the dead-man type.

- Connections with high pressure hoses must be secured with a safety lashing/whip check. Safety lashings shall consist of two metal hose clamps connected by a suitably flexible strong cable, chain, or wire with the metal hose clamps attached to the hose ends separated by quick makeup connection.
- Hydraulic system pressurized hoses, clamps, and safety cables on drill rigs should be visually inspected daily and whenever damage or strain might have occurred.
- Mixing and grout pumps when in operation are pressurized systems. When working with mixing/grout pumps ensure connections between piping, hoses, and pumps are secure and safety cables attached if required to ensure dangerous eruptions or spraying of fluids does not occur. If material is being pumped ensure the energy being put forth will not short circuit in a fashion that might pose a potential risk.
- Perform lockout/tagout procedures prior to accessing, disconnecting, or attempting repairs to drill rig pressurized lines and associated components.

5.0 REFERENCES

United States Army Corps of Engineers. 2014. Safety and Health Requirements Manual, EM 385-1-1, Washington, D.C., November 30.

SOP-06

LITHOLOGIC LOGGING

1.0 OBJECTIVE

This technical standard operating procedure (SOP) governs basic lithologic logging of surface and subsurface soil samples collected for field operations at the Munitions Training Range (MTR) site. The purpose of this SOP is to present a protocol and standardized documentation format for lithologic observations. Protocols for recording basic lithologic data including, but not limited to, soil types (per the Unified Soil Classification System [USCS] classification), presence of fill (and associated deleterious materials), lithologic names, color, moisture, density, contacts, and secondary features such as organic material and fractures.

The goal of this SOP is to have consistent descriptions of the subsurface materials.

2.0 BACKGROUND

Lithologic information about soil, rock, and fill assists in the understanding of subsurface conditions, moisture infiltration, groundwater flow, and potential contaminant migration pathways.

2.1 DEFINITIONS

The following list corresponds to the description sequences outlined in Section 5.2.1. An example lithologic log is included in Attachment A.

Name of Sediment or Rock – In naming unconsolidated sediments, the logger shall describe the grain size, distribution, color, and moisture content, and determine the presence of fill materials. In naming sedimentary rocks, the logger shall examine the specimen for mineralogy and use the appropriate rock description.

Color - Color may be determined using the appropriate Munsell color chart (soil or rock) and listing the Munsell number that corresponds to the color. If an unconsolidated material is mottled in color, the ranges in color shall be described. When describing core samples with several individual colors, individual color names shall be listed, and an overall best color name shall be given.

Degree of Consolidation – The degree of consolidation refers to how well the material has been indurated. Unconsolidated sediments may be compacted somewhat and should be described as loose, moderately compacted, or strongly compacted. In some cases, they may be slightly cemented by caliche and should be described as slightly cemented, moderately cemented, or strongly cemented. Sedimentary rocks are typically indurated but may vary in the degree of cementation.
These rocks should be described as friable, moderately friable, or well indurated. If the logger believes he/she can identify the cementing material, then it shall be included in the description.

Moisture Content – Moisture content refers to the amount of water within the sediment or the matrix. Sedimentary rocks and unconsolidated sediments may have associated

moisture within and should be described as dry, slightly moist, medium moist, moist, wet (not flowing), or saturated (flowing water).

Evidence of Contamination – The logger should examine the sample/core and note any obvious signs of contamination such as streaking, free product, odor, or discoloration. These observations will be noted in the field book and on the lithologic log, as well as screening measurements from the photoionization detector (PID) and radiation (alpha, beta) probes.

Description of Contacts – The logger will note changes in lithology. These changes may be gradational contacts within sediments or may be sharp contacts such as sediments over rocks. The logger should describe whether the contacts are gradational or sharp and note the depth below the surface.

Composition – The composition of the rock refers to the mineralogy of the material encountered. The logger should describe the mineralogy if it can be determined.

2.2 ASSOCIATED PROCEDURES

- SOP, *Surface Soil Sampling*
- SOP, *Subsurface Soil Sampling with Hand Auger*
- SOP, *Field Data Collection Documents, Content, and Control*

2.3 DISCUSSION

The subsurface sampling techniques used at MTR is Direct Push all result in sandy soil being brought to the surface for description and logging. The soil boring, core retrieval, and lithologic logging will be conducted under the guidance of a Arizona professional geologist, or other earth scientist under a geologist's supervision. An important aspect of soil sampling is the identification and differentiation of native soil/rock from the site. To help in this task, it is important to use the USCS classification scheme, and uniform and consistent descriptions. Soil and rock descriptions will be consistent with ASTM 2488-06 (Standard Practice for Description and Identification of Soils – Visual Manual Procedure). This SOP also provides a sequence for recording information on a standardized log form to make descriptions as uniform and consistent as possible.

The local geology of MTR is well characterized. Local soil and rock are well documented. As such, detailed lithologic logs are not necessary. The primary goal of lithologic logging is to document the stratigraphic sequence, the presence of fill or native soil, occurrence and type of debris and/or staining, associated PID and radiological screening values, and deviations from the normal or anticipated stratigraphic section.

In addition, all SOPS will be on hand with the field sampling crew.

3.0 GENERAL RESPONSIBILITIES

Field Team Leader (FTL) – The FTL is responsible for maintaining logbooks and qualified field staff.

Site Geologist – Individual responsible for describing and logging of all soil cuttings/samples and all rock per this SOP. A geologist is required to lead this project work.

4.0 REQUIRED EQUIPMENT

The description of subsurface lithologies requires a minor amount of field equipment for the geologist. This section provides a list of equipment to be used by the lithologic logger but does not include equipment such as drill rigs, PID, sampling equipment, and personal protection equipment. The following is a general list of equipment that may be used:

- Field logbook and lithologic log form
- Clipboard
- Munsell color chart for soil
- Waterproof pens
- 10x magnifying hand lens
- Knife or cutting tools

5.0 PROCEDURES

5.1 OFFICE

- Obtain field logbook and lithologic log forms
- Coordinate schedules/actions with
- Obtain necessary field equipment (see above)
- Review field support documents (i.e., Field Sampling Plan [FSP] Addendum, health and safety plan)
- Review applicable geologic references such as historic lithologic logs from the site and/or geologic maps, as needed

5.1.1 DOCUMENTATION

Record observations in a bound field logbook and/or on individual lithologic log forms. Site geologists (i.e., lithologic loggers) will follow the general procedures for keeping a field logbook. If using a bound field logbook, record the same data required on the lithologic log form. Data from the field logbook must be transcribed to the lithologic log form if filling in the form in the field is not feasible. In this case, the data must be the identical to those recorded in the field logbook. Post- logging editing of field logbook data is not allowed. In addition, if data are transcribed to the lithologic log form, it must be completed within 24 hours of the original data recording. All blanks in the lithologic log form must be filled out; if an item is not applicable, an “NA” shall be entered.

The Lithologic Log Form shall be filled out according to the following instructions. The front page of the form contains general information:

- The project name, sample location, subarea, and sample type
- Date that the drilling activity was started and completed
- Name of the person logging along with the beginning depth-end depth (in feet)
- Borehole diameter(s) and drilling methods
- Name and company of the driller and the type of sampling tool used

A map showing the soil sampling location may be attached.

The continuation page(s) of the log form should be completed according to the instructions provided within this section and according to the sequence provided in Section 5.2.1. The depth column refers to the depth below ground surface (bgs) in feet. The tick marks can be arbitrarily set to any depth interval depending on the scale needed except where client
requirements dictate the spacing. The lithology column shall contain the USCS soil type/rock type; schematic symbols are not required. Use a single X to mark the area where no core was recovered, and notes shall be recorded as to why the section was not recovered. Sharp or abrupt contacts between lithologies will be indicated by a solid horizontal line. Gradational changes in lithologic composition should be noted. PID and radiation measurements will be recorded within the PID column at the appropriate depth. The description column, where the lithology is described, is the most important part of the lithologic log.
In completing this section, use the applicable reference charts and complete according to the sequence in Section 5.2.1. The
sample interval column is reserved for noting any samples taken and processed for the laboratory. The sample number shall be filled in at the appropriate depth. The last column

refers to the percent core recovery. The geologist will estimate the amount recovered and record the percentage at the appropriate depth.

In addition to the information on the log form, the geologist will record the appropriate information into the logbook when there is a rig shutdown, rig problems, failures to recover cores, or other issues.

5.2 GENERAL GUIDELINES FOR USING AND SUPPLEMENTING LITHOLOGIC DESCRIPTIVE PROTOCOLS

This SOP is intended to serve as a guide for recording basic lithologic information. The descriptive protocol presented here must be followed in making basic observations. Selected information charts may be used for classification and naming of rock, sediment, and soil. Some observations will be common to all rock and soil descriptions. All descriptions shall include as appropriate: name of sediment or rock, color (using the Munsell color charts), moisture content, composition, significant inclusions, and degree of consolidation or induration, and the presence and type of fill materials, if identified. The description
of each category shall be separated by a semicolon. Any interpretive comments will be segregated from lithologic descriptions and recorded in the remarks column.

Describe all unconsolidated sediment and soil according to the USCS. It is often more practical to use abbreviations for often- repeated terminology when recording lithologic descriptions. Abbreviations are allowed; however, the abbreviation and its meaning must be recorded on the lithologic log the first time it is used or listed at the bottom the log. Loggers are cautioned
to limit the use of abbreviations to avoid a lithologic log that is cryptic.

5.2.1 PROTOCOLS FOR LITHOLOGIC DESCRIPTION OF DISCRETE SOIL OR ROCK CORES

This section describes the protocols for completing a lithologic description based on discrete soil or rock core samples. For instance, in a 5-foot soil core, the dominant lithology may be sand that is interrupted by several thin beds of another lithology such as clay. This section description can be simplified by writing: 5-10 bgs = sand (with other descriptors) except as noted; 7-8 foot clay zone (with descriptors); 8-9 foot pebble zone (with descriptors); etc. This also aids in “seeing” the thickest unit designations possible for use in modeling.

Description of Unconsolidated Material

Unconsolidated material comprises the majority of the subsurface interval for the Phase 3 investigation. The shallow subsurface is very important to the chemical characterization because of infiltration and migration. Soils are to be described as unconsolidated material and will include:

- Name of sediment (sand, silt, clay, etc.)
- Grain size and distribution
- Composition of larger-grained sediments
- Degree of consolidation and cementation
- Moisture content
- Density

- Color (per Munsell color chart)
- Description of contacts

In accordance with the USCS on naming unconsolidated sediment, the particle size with the highest percentage is the root name. When additional grains are present in excess of 15 percent, the root name is modified by adding a term in front of the root name. For instance, if a material is 80 percent sand and 20 percent gravel, then it is gravelly sand. If the subordinate grains comprise less than 15 percent but greater than 5 percent, the name is written:_____ (dominant grain) with:_____ (subordinate grain). For example, a soil with 90 percent sand and 10 percent silt would be named a sand with silt. If a soil contains greater than 15 percent of four particle sizes, then the name is comprised of the dominant grain size as the root name and modifiers as added before. For example, if a material is 60 percent sand, 20 percent silt, and 20 percent clay the name would be a silty clayey sand. If a material is 70 percent sand, 20 percent silt, and 10 percent clay, it would be a silty sand with clay. When large cobbles or boulders are present, their percentage shall be estimated, and their mineralogy recorded.

6.0 PHOTO DOCUMENTATION

Photo documentation of the site, soil cuttings and samples will be conducted when requested by the client or on-site geologist. Photographs will be used to document sediment type, grain size, and color. Photos will be collected with a digital camera or cell phone is approved. These photos will be logged in and uploaded to a photograph database or file for viewing by all parties associated with the drilling operation. These photos are intended to compliment soil evaluation/lab analysis and are not intended to take the place lab evaluation of the soil.

7.0 RESTRICTIONS/LIMITATIONS

Only geologists, or similarly qualified persons trained in lithologic description, are qualified to perform the duties described in this SOP. MCAS Yuma Environmental will have the authority to decide whether an individual is qualified

8.0 REFERENCES

ASTM 2488-06 Standard Practice for Description and Identification of Soils – Visual Manual Procedure

9.0 ATTACHMENTS

Note: These Attachments are for informational purposes. Other equivalent charts such as USCS or logs may be used.

Attachment A - Lithologic Logs
Attachment B - Common Abbreviations for Lithologic Logging
Attachment C - Naming of Unconsolidated Materials
Attachment D - Example of Unified Soil Classification System (USCS)

Attachment A: Lithologic Log

Attachment B: Common Abbreviations

Common Abbreviations		
Abundant – abnt	Diameter – dia	Laminated – lam
Amount – amt	Different – diff	Maximum – max
Approximate – approx	Disseminated – dissem	Pebble – pbl
Arenaceous – aren	Elevation – elev	Phenocryst – phen
Argillaceous – arg	Equivalent – equiv	Porphyritic – proph
Average – ave	Foliated – fol	Probable – prob
Bedded – bdd	Formation – frm	Quartz – qrz
Bedding – bdg	Fracture – frac	Regular – reg
Calcareous – calc	Fragmental – frag	Rocks – rx
Cemented – cmt	Granular – gran	Rounded – rnd
Cobble – cbl	Gypsiferous – gyp	Saturated – sat
Contact – ctc	Horizontal – hriz	Secondary – sec
Cross-bedded – xbdd	Igneous – ign	Siliceous – sil
Cross-bedding – xbdg	Inclusion – incl	Structure – struc
Cross-laminated – xlam	Interbedded – intbdd	Unconformity – uncnf
Crystal – xl	Irregular – ireg	Variegated – vrgt
Crystalline – xln	Joint – jnt	Vein – vn
Grain Size	**Contacts**	**Sorting**
grain – gn	gradational – grad	poor – pr
fine – f	erosional – er	moderate – mod
very fine – vf	abrupt – ab	well – well
medium – med		
coarse – crs	**Fabric**	
large – lg	grain supported – gs	
very large – vlg	matrix supported – ms	
small – sm	imbricate – im	

Attachment C: Naming of Unconsolidated Materials

Main Particle	Gravel	Sand	Silt	Clay
> 15 % gravel	Gravel	Gravelly sand	Gravelly silt	Gravelly clay
> 15 % sand	Sandy gravel	Sand	Sandy silt	Sandy clay
> 15 % silt	Silty gravel	Silty sand	Silt	Silty clay
> 15 % clay	Clayey gravel	Clayey sand	Clayey silt	Clay
5-15 % gravel	Not applicable	Sand with gravel	Silt with gravel	Clay with gravel
5-15 % sand	Gravel with sand	Not applicable	Silt with sand	Clay with sand
5-15 % silt	Gravel with silt	Sand with silt	Not applicable	Clay with silt
5-15 % clay	Gravel with clay	Sand with clay	Silt with clay	Not applicable
> 15% gravel plus 15% sand	Sandy gravel	Gravelly sand	Gravelly sandy silt	Gravelly sandy clay
> 15% gravel plus 15% silt	Silty gravel	Gravelly silty sand	Gravelly silt	Gravelly silty clay
> 15% gravel plus 15% clay	Clayey gravel	Gravelly clayey sand	Gravelly sandy silt	Gravelly clay
> 15% sand plus 15% silt	Silty sandy ravel	Silty sand	Sandy silt	Sandy silty clay
> 15% sand plus 15% clay	Sandy clayey gravel	Clayey sand	Sandy clayey silt	Sandy clay
> 15% silt plus 15% clay	Silty clayey gravel	Silty clayey sand	Clayey silt	Silty clay
Note: Other combinations are possible when all particle sizes are present in greater than 15%. For example, a silty clayey gravelly sand. Other possible combinations exist such as a gravelly sand with silt.				

Compton, R.R., *Manual of Field Geology*, 1962.

Attachment D: Example of Unified Soil Classification System (USCS)

Summary of USCS Field Identification Tests

Coarse-Grained Soils **More than half the material (by weight) is individual grains visible to the naked eye.**	**Gravelly Soils** More than half of coarse fraction is larger than 4.75 mm.		**Clean Gravels** Will not leave a stain on a wet palm	Substantial amounts of all grain particle size			GW
				Predominantly one size or range of sizes with some intermediate sizes missing			GP
			Dirty Gravels Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)			GM
				Plastic fines (to identify, see CL below)			GC
	Sandy Soils More than half of coarse fraction is smaller than 4.75 mm.		**Clean Sands** Will not leave a stain on a wet palm	Wide range in grain size and substantial amounts of all grain particle sizes			SW
				Predominantly one size or a range of sizes with some intermediate sizes missing			SP
			Dirty Sands Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)			SM
				Plastic fines (to identify, see CL below)			SC
Fine-Grained Soils **More than half the material (by weight) is individual grains not visible to the naked eye.** **(<0.074 mm)**	**Ribbon**	**Liquid Limit**	**Dry Crushing Strength**	**Dilatancy**	**Toughness**	**Stickiness**	
	None	<50	None to Slight	Rapid	Low	None	ML
	Weak	<50	Medium to High	None to Very Slow	Medium to High	Medium	CL
	Strong	>50	Slight to Medium	Slow to None	Medium	Low	MH
	Very Strong	>50	High to Very High	None	High	Very High	CH
Highly Organic Soils	Readily identified by color, odor, spongy feel, and frequently by fibrous texture						OL OH Pt

SOP 07

SUBSURFACE SOIL SAMPLING

1.0 OBJECTIVE

The objective of this standard operating procedure (SOP) is to define the techniques and requirements of the contractor's employees for collecting soil samples from the unconsolidated zone. Techniques include use of hand augers, Shelby tubes, continuous core samples, split spoon samplers and direct push technology (DPT) drill rig or Geoprobe®.

2.0 BACKGROUND

2.1 Definitions

Drill Rig – A mobile mechanical device used to drill soil boring(s) (borehole[s]) to reach the subsurface to collect soil samples.

Unconsolidated Zone – The layer of soil above bedrock that exists in a relatively loose state

Hand Auger – A stainless steel cylinder (bucket) approximately 7 to 10 centimeters (cm) (3 to 4 inches) in diameter and 30 cm (1 foot) in length, open at both ends with the bottom edge designed to twist into the soil and cut out a soil core. The bucket collects the soil sample. The auger has a T-shaped handle (for hand operation) attached to the top of the bucket by a stainless steel rod(s).

Shelby Tube – A cylindrical sampling device, generally made of steel, that is driven into the subsurface soil through the hollow-stem auger. The tube, once retrieved, may be copped and the undisturbed soil sample extruded in the laboratory prior to analysis.

Split-Spoon/Split-Barrel Sampler – A cylindrical sampling device generally made of carbon steel that fits into a hollow-stem auger. The spoon is hinged lengthwise, which allows the sample to be retrieved by opening (“splitting”) the spoon.

Slide Hammer – A device consisting of a drive weight (hammer) and a drive weight fall guide.

Subsurface Soil – The soil that exists deeper than approximately 30 cm (1 foot) from the surface, but above bedrock or any other consolidated material.

Grab Sample – A discrete portion or aliquot taken from a specific location at a given point in time.

Liner – A cylindrical sampling device, generally made of brass, stainless steel, or Teflon® that is placed inside a split-spoon or hand auger bucket to collect undisturbed samples.

Composite Sample – Two or more sub-samples taken from a specific media and location or site at a specific point in time. The sub-samples are collected and mixed (homogenized), and then one single average sample is collected from the mixture.

Auger Flight – A steel section length attached to an auger to extend the auger and remove unconsolidated material as coring depth increases.

DPT Drill Rig (Geoprobe®) - A hydraulically operated, hammer device installed in the back of a van or pickup truck, used to advance a hollow-stem rod into the soil for the purpose of collecting soil, soil gas, or groundwater samples.

2.2 Discussion

Shallow subsurface soil samples (to depths between 0.15 cm to 3 meters (m) [6 inches and 10 feet]) may be collected using hand augers. However, soil samples collected with a hand auger are commonly of poorer quality than those collected by split-spoon/ split-barrel or Shelby tube samplers since the soil sample is disturbed in the augering process. Split-spoon/ split barrel and Shelby tube liners are generally used during collection of soil samples using a hollow-stem auger, but may also be used to collect undisturbed soil samples from hand auger borings using a slide-hammer device. Liners are used to minimize the loss of volatile organic compounds (VOCs). The size and construction material of sampling devices should be selected based on project and analytical objectives and defined in site-specific plans.

2.3 Associated Procedures

SOP 1 – Sample Custody
SOP 2 – Packaging and Shipping Environmental Samples
SOP 3 – Field Logbook Content and Control
SOP 4 – Field Equipment Decontamination

3.0 RESPONSIBILITIES

Site Manager – The site manager is responsible for ensuring that field personnel are trained in the use of this procedure and the required equipment, and for ensuring that subsurface soil samples are collected in accordance with this procedure and any other SOPs pertaining to specific media sampling. The site manager must also ensure that the quantity and location of subsurface soil samples collected meet the requirements of the site-specific plans.

Field Team Leader – The field team leader is responsible for ensuring that field personnel collect subsurface soil samples in accordance with this SOP and other relevant procedures.

4.0 REQUIRED EQUIPMENT

4.1 General

- Weighted cloth measuring tape
- Water level meter (if applicable)
- Site-specific plans
- Field logbook
- Indelible black ink pens and markers
- Labels and appropriate forms/ documentation for sample shipment
- Clear, waterproof tape
- Appropriate sample containers
- Insulated cooler(s)
- Ice bags or “blue ice”
- Nitrile, Latex or equivalent sampling gloves
- Plastic sealable bags (ziploc™)
- Personal protective clothing and equipment
- Stainless steel and/or Teflon®-lined equipment
- Plastic sheeting
- Decontamination supplies

Additional equipment is discussed in Section 5.2.5, Field Sampling/Preservation Methods.

4.2 Manual (Hand) Augering

- T-handle
- Hand auger: hand auger cylinder bucket-, tube-type auger as required by the site-specific plans
- Extension rods
- Rubber hammer
- Wrench(es), pliers

4.3 Split-Spoon/Split-Barrel and Shelby Tube Sampling

- Drill rig equipped with a 63-kilogram (kg) (104-lb) drop hammer and sufficient hollow-stem augers to drill to the depths required by the Work Plan, Sampling and Analysis Plan (SAP), or site-specific plans.
- Sufficient numbers of split spoon/split-barrel or Shelby tube samples so that at least one is always decontaminated and available for sampling. Three split-spoon/split-barrel or Shelby tube samples are generally the minimum necessary. (Shelby tubes are usually used only once.)
- Split-spoon liners (as appropriate).
- Wrench(es), hammer, large flat head screw driver, other appropriate tools.

4.4 DPT Drilling (Geoprobe®)

- Extruder rack and piston (if soil is to be extruded into a sample container – otherwise, the steel sample tube with the Standard and Kansas Samplers or acetate liner with the Large Bore Sampler may be shipped to the laboratory, as indicated in the site-specific plans).
- Assembled soil samplers (i.e., Standard 10-inch or 24-inch Sampler, Kansas Stainless Sampler, or Large Bore Sampler – refer to the Geoprobe® Systems Equipment and Tools Catalog for specific parts for each sampler.

5.0 PROCEDURES

5.1 Utility Clearance

1. Review site plans and aerial photographs of the investigation area.

2. Perform a site visit and conduct markouts of proposed soil boring locations. Mark each location with white marking paint or with a pin flag.

3. Contact Underground Surface Alert (USA) DigAlert, Arizona Blue Stake, or the equivalent state operated underground service alert utility service within two business days of anticipated drilling activities. Obtain dig tickets and keep on file.

4. If the project is for a federal client (Navy, Marines, Army, Air Force), obtain a dig permit through the appropriate public works office at the installation.

5. If the project budget allows, arrange for utility clearance (geophysical survey) provided by a contractor, as another safe guard toward utility clearance / avoidance.

6. If any location is within three lateral feet from any suspected utility, reposition the proposed soil boring accordingly.

5.2 Preparation

7. Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.

8. Locate sampling location(s) in accordance with the Work Plan, SAP, or project document(s).

9. Discuss sample depths or intervals with the drilling operator and keep a weighted measuring tape at the ready (decontaminated).

10. Clear away vegetation and debris from the ground surface at the boring location.

11. Prepare an area next to the sample collection location for laying out cuttings by placing plastic sheeting on the ground to cover immediate area surrounding the borehole. In cases where samplers are retrieved from the borehole (split spoon or Shelby tube) and must be placed on a surface for soil lithology logging and or sample collection, place sampling devices on a foldable table covered by decontaminated visqueen sheeting.

12. Set up a three stage decontamination station, if decontamination is required, in accordance with SOP 04. For sites requiring decontamination between samples, the first two buckets shall be comprised of tap water. The third bucket shall be comprised of distilled water. Alconox or liquinox shall be added to the first bucket. Decontamination water should be changed out daily, or in accordance with the Work Plan, SAP, or site specific plan.

5.2 Collection

The following general steps must be followed when collecting all subsurface soil samples:

1. VOC samples or samples that may be degraded by aeration shall be collected first and with the least disturbance possible.

2. Sampling information, including lithologic descriptions, shall be recorded in the field logbook and on any associated forms.

3. Specific sampling devices to be used shall be identified in the site-specific plans and recorded in the field logbook.

4. Care must be taken to prevent cross-contamination and misidentification of samples. Disposable gloves shall be changed out between samples.

5. Sample containers containing samples for VOC analysis should be filled completely to minimize headspace.

5.2.1 Manual (Hand) Augering

The following steps must be followed when collecting hand auger samples:

1. Advancing hand auger soil borings is also a way of using “hand tools” as part of utility clearance. Advancing any soil boring by hand auger to 5 feet below ground surface (bgs) is considered the standard practice before drilling using mechanized equipment to a deeper total depth.

2. Hand auger to the depth required for sampling. Place cuttings on plastic sheeting or as specified in the site-specific plans. If possible, lay out the cuttings in stratigraphic order.

3. Throughout the augering, make detailed notes concerning the geologic features of the soil or sediments in the field logbook or soil boring log form.

4. Cease augering when the top of the specified sampling depth has been reached. If required remove the auger from the hole and decontaminate the auger or use a separate decontaminated auger, then obtain the sample.

5. Collect a grab sample for VOC analyses (or samples that may be degraded by aeration) immediately and place in sample container. Sample bottles should be filled completely to minimize headspace.
6. Remaining sample should be homogenized for other analyses prior to placing samples in the appropriate containers. Label containers as required.

7. Wipe containers with a clean Kimwipe or paper towel to remove residual soil from the exterior of the container(s).

8. Label the sample container with the appropriate information.

9. Place the containers in a sealable (Ziploc™) plastic bag and seal the bag. Pack samples in a cooler with ice.

10. Proceed with further sampling, as required by the Work Plan, SAP, or site-specific plans.

11. When all sampling is complete, dispose of cuttings, plastic sheeting, etc. as specified in the Work Plan, SAP, or site-specific plans.

12. Complete the field logbook entry and other appropriate forms being sure to record all relevant documentation. Remand custody of samples to the appropriate personnel.

5.2.2 Split-Spoon/Split-Barrel Sampling

Note: Steps 1 through 12 describe activities to be performed by a licensed drilling contractor, not the contractor's personnel.

The following steps must be followed when collecting split-spoon samples:

1. Remove any pavement and sub-base material from an area of twice the bit diameter, if necessary.

2. Advance the soil boring by hand auger to a minimum of 5 feet bgs prior to advancing the soil boring by drill rig. The hand auger bucket should be as close to the diameter of the down-hole drilling equipment as possible.

3. The drilling rig will be decontaminated at a separate location prior to drilling, per SOP 04, or the site-specific decontamination procedures.

4. Attach the hollow-stem auger with the cutting head, plug, and center rod(s) to the drill rig.

5. Begin drilling and proceed to the first designated sample depth, adding auger(s) as necessary.

6. Upon reaching the designated sample depth, slightly raise the auger(s) to disengage the cutting head, and rotate the auger without advancement to clean cuttings from the bottom of the hole

7. Remove the plug and center rods.

8. If required by the site-specific sampling plan, install decontaminated liners in the split spoon/split barrel sampler.

9. Install a decontaminated split-spoon on the center rod(s) and insert it into the hollow-stem auger. Connect the hammer assembly and lightly tap the rods to seat the drive shoe at the top of undisturbed soil or sediment.

10. Mark the center rod in 15-cm (6-inch) increments from the top of the auger(s).

11. Drive the split-spoon using the hammer. Use full 75-cm (30-inch) drop as specified by the American Society of Testing and Material (ASTM) Method D-1586. Record the number of blows required to drive the spoon or tube through each 15-cm (6-inch) increment.

12. Cease driving when the full length of the spoon has been driven or upon refusal. Refusal occurs when little or no progress is made for 50 blows of the hammer. ASTM D1586-99 (Sections 7.2.1 and 7.2.2 defines “refusal” as >50 blows per 6-inch advance or a total of 100 blows

13. Pull the split-spoon free by using upswings of the hammer to loosen the sampler. Pull out the center rod and split-spoon.

14. Unscrew the split-spoon assembly from the center rod and place it on the plastic sheeting.

15. Remove the drive shoe and head assembly. If necessary, tap the split spoon assembly with a hammer to loosen threaded couplings.

16. With the drive shoe and head assembly off, open (split) the split-spoon, being careful not to disturb the sample.

17. Label sample containers with appropriate information. If liners were used, immediately install Teflon® tape over the ends of the liners, cap the liners, and seal

the caps over the ends of the liner with waterproof tape. Label the samples as required by the site specific plans. Mark the top and bottom of each sample on the outside of each liner. Indicate boring/well number and depth on the outside of the liner, as required.

18. If VOC analyses are to be conducted on the soil sample and liners were not used, place that sample in its sample container immediately after opening the split-spoon, filling the sample bottle completely. Seal the container immediately, then describe it in the field logbook and/ or associated forms. Record the sample identification number, depth from which the sample was taken, and the analyses to be performed on the samples in the field logbook, appropriate forms and on the chain of custody.

19. Remaining sample should be homogenized prior to placing samples in appropriate containers.

20. Wipe containers with a clean Kimwipe or paper towel. Label containers as required when liners are not used.

21. Place containers and/or sealed liners in a sealable (Ziploc™) plastic bag and seal the bag . Pack samples in a chilled cooler.

22. In the field logbook and on the soil boring log form, describe sample lithology by observing cuttings and/or the bottom of the liner.

23. Continue to advance the borehole to the next sampling point. Collect samples as outlined above.

24. When sampling is complete, remove the drilling rig to the heavy equipment decontamination area.

25. Dispose of cuttings, plastic sheeting, etc., as specified in the Work Plan, SAP, or site-specific plans. Backfill bore hole as specified in the Work Plan, SAP, or project-specific plans.

26. Decontaminate split-spoons and other small sampling equipment according to SOP 04, before proceeding to other sampling locations or sampling intervals.

27. Complete the field logbook entry and other form, being sure to record all relevant information before leaving the site.

28. Properly package all samples for shipment to laboratories and complete all necessary sample shipment documentation. Remand custody of the samples to the appropriate personnel.

5.2.3 **DPT Drilling (Geoprobe®) Sampling**

1. Advance the soil boring by hand auger to a minimum of 5 feet bgs prior to advancing the soil boring by drill rig. The hand auger bucket should be as close to the diameter of the down-hole drilling equipment as possible.

2. Assemble the sampling device as follows:

a. Screw the cutting shoe to the bottom end of the sample tube (unless using standard probe drive sampler which has built-in cutting edge).
b. Screw the piston tip onto the piston rod.
c. Screw the drive head onto the top end of the sample tube.
d. If using Teflon® liner, insert liner into sample tube.
e. Slide the piston rod into the sample tube, leaving the piston tip sticking out of bottom end of the sample tube.
f. Screw the piston stop pin onto the top end of the piston rod in a counter-clockwise direction.

3. Attached the assembled sampler onto the leading probe rod. A 12-inch probe rod is recommended to start the 24-inch standard and large bore samplers.

4. Thread the drive cap onto the top of the probe rod and advance the sampler. Replace the 12-inch rod with a 36-inch rod as soon as the top of the sampler is driven to within 6 inches of the ground surface.

5. Advance the sampler to the interval to be sampled using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.

6. Move the probe unit back from the top of the probe rods and remove the drive cap.

7. Lower the extension rods into the inside diameter of the probe rods using extension rod couplers to join the extension rods.

8. Attach the extension rod handle to the top extension rod and rotate the handle clockwise until the leading extension rod is screwed into the piston stop pin. Continue to rotate the handle clockwise until the stop pin disengages from the drive head.

9. Remove the extension rods and attached piston stop pin from the probe rods.

10. Replace the drive cap, mark the top probe rod with a marker or tape at a distance above the ground equal to the length of the sample tube (either 12 or 24 inches).

11. Advance the probe rods using the hydraulic hammer to the length of the sample tube (either 12 or 24 inches).

12. Replace the drive cap with the pull cap and retract the probe rod(s). Secure the rod(s) with a clamp or by hand during removal so they do not fall back down the resulting borehole.

13. Detach the sampler from the lead probe rod, verifying the sufficient sample volume was recovered (the length of sample contained within the tube is approximately equal to the length of exposed piston rod).

14. Disassemble the sample. If the sample is to be analyzed for VOCs, then the sample tube or liner should be sealed immediately by placing a Teflon® septa over the ends and covering them with plastic caps.

15. If samples do not require VOC analysis, they may be extruded from the sampler and transferred to the sample jars specified in the Work Plan, SAP, site-specific plans, or

SOPs 2 “Packaging and Shipping of Environmental Samples”. Samples can be extruded by one of two methods:

a. Using a DPT drill rig or Geoprobe® rig and the extruder rack, position the extruder rack on the foot of the Geoprobe® derrick; insert the sample tube into the extruder rack with cutting end up; and position the extruder piston, pushing the sample out of the sample tube using the (probe) function. Catch the sample as it exits beneath the extruder in a sample jar or stainless steel mixing bowl. Samples to be collected for VOCs will be collected directly from the sample tube into the sample jars.
b. Lightly tap the side of the sample tube with a hammer while also lightly pushing the Piston Rod.

16. Label the sample liner or sample jars as required, securing the label by covering it with a piece of clear, waterproof tape.

17. Homogenize the sample in a stainless steel bowl with a stainless steel spoon or spatula. Transfer the sample from the bowl to the sample container.

18. Clean the outside of the sample jars and place individual samples into sealable bags and seal closure.

19. Place samples in a cooler containing ice.

5.3 Field Sampling/Preservation Methods

The following three sections contain SW 846 Methods for sampling and field preservation. These methods include EN CORE Sampler method for low-level limits, En CORE Sampler Method for high-level limits/ screening, and methanol preservation. These methods may be used if required by the EPA Region, client, or governing sample plan. These methods are very detailed and contain equipment requirements at the beginning of each section.

When collecting soil samples using the EN CORE Sampler Method, collection of soil for moisture content analysis is required. Results of this analysis are used to adjust “wet” concentration results to “dry” concentrations to meet analytical method requirements.

Note: Some variations from these methods, (e.g., sample volume) may be required depending on the contracted analytical laboratory.

5.3.1 EN CORE Sampler Collection for Low Level Analyses (≥ 1ug/kg)

5.3.1.1 EN CORE Sampling Equipment Requirements

The following equipment is required for low-level analysis:

- Three 5 gram (g) samplers

Note: The sample volume requirements specified are general requirements. Actual sample volume and/or container sizes may vary depending on client or laboratory requirements.

- One 110 –milliliter (mL0 (4-ounce [oz]) widemouth glass jar or applicable container for moisture analysis
- One T-Handle
- Paper Towels

5.3.1.2 EN CORE Sampling Steps for Low Level Analysis

1. Remove sampler and cap from package and attach T-handle to sampler body.

2. Quickly push the sampler into a freshly exposed surface of soil until the sampler is full. The O-ring will be visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

3. Extract sampler and wipe the sampler head with a paper towel so that the cap can be tightly attached.

4. Push cap on with a twisting motion to secure to the sampler body.

5. Rotate the sampler stem counterclockwise until stem locks in place to retain sample within the sampler body.

6. Fill out sample label and attach to sampler.

7. Repeat procedure for the remaining two samplers.

8. Collect moisture sample in 110-mL (4-oz) wide-mouth jar using a clean stainless steel spoon or trowel.

9. Store samplers at 4-degrees (^{0}) Celsius (C), ± 2^0 C. Samples must be shipped and delivered to the analytical laboratory for extraction with 48 hours.

Note: Verify requirements for extraction/holding times.

5.3.2 EN CORE Sampler Collection for High level Analyses (≥200 ug/kg)

5.3.2.1 EN CORE Sampling Equipment Requirements

The following equipment is required for high-level analysis:

- One 5-g sampler or one 25-g sampler (The sampler size used will be dependent on client and laboratory requirements.
- One 110-mL (4 oz) wide-mouth glass jar or applicable container specified for moisture analysis.
- One T-handle.
- Paper towels

5.3.2.2 EN CORE Sampling Steps for High Level Analysis

1. Remove sample and cap from package and attach T-Handle to sampler body.

2. Quickly push the sampler into a freshly exposed surface of soil until the sampler is full. The O-ring will be visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

3. Extract sampler and wipe the sampler head with a paper towel so that the cap can be tightly attached.

4. Push cap on with a twisting motion to secure to the sampler body.

5. Rotate the sampler stem counterclockwise until stem locks in place to retain sample within the sampler body.

6. Fill out sample label and attach to sampler.

7. Collect moisture sample in 110-mL (4-oz) wide-mouth jar using a clean stainless steel spoon or trowel.

8. Store samplers at 4-degrees (^{0}) Celsius (C), ± 2^0 C. Samples must be shipped and delivered to the analytical laboratory for extraction with 48 hours.

Note: Verify requirements for extraction/holding times.

5.3.3 Methanol Preservation Sampling

5.3.3.1 Methanol Preservation Sampling Equipment Requirements

- One pre-weighed jar that contains methanol or a pre-weighed empty jar accompanied with a pre-weighed vial that contains methanol (laboratory grade)
- One dry weight cup
- Weighing balance that accurately weighs to 0.01 g (with accuracy of ± 0.01g)
- Set of balance weights used in daily balance calibration
- Latex gloves
- Paper towels
- Cutoff plastic syringe or other coring device to deliver 5 g or 25 g of soil

5.3.3.2 Sampling Preservation Steps

1. Wear gloves during all handling of pre-weighed vials.

2. Weigh the vial containing methanol preservative to the nearest 0.01 g. If the weight of the vial with methanol varies by more than 0.01 g from the original weight recorded on the vial, discard the vial. If the weight is within tolerance, it can be used for soil preservation/ collection below.

3. Quickly collect a 5-g or 25 g sample using a cutoff plastic syringe or other coring device designed to deliver 5-g or 25-g of soil from a freshly exposed surface of soil. The 5-g or 25-g size is used is dependent on client and laboratory requirements.

4. Carefully wipe the exterior of the collection device with a clean paper towel.

5. Quickly transfer the soil to an empty jar or a jar that contains methanol. If extruding into a jar that contains methanol, be careful not to splash the methanol outside of the vial. Again, the type of jar used is dependent on the client or laboratory requirements.

6. If the jar used to collect the soil plug was empty before the soil was added, immediately preserve with the methanol provided using only one vial of methanol preservative per sample jar.

7. Using the paper toweling, remove any soil off of the vial threads and cap the jar.

8. Weigh the jar with the soil in it to the nearest 0.01-g and record the weight on the sample label.

9. Collect dry weight sample using a clean stainless steel spoon or trowel.

10. Collect dry weight sample using a clean stainless steel spoon or trowel.

11. Store samples at 4^0, $\pm 2^0$ C.

12. Ship sample containers with plenty of ice in accordance with the Department of Transportation (DOT) regulations (CORROSIVE, FLAMMABLE LIQUID, POISON) to the laboratory

6.0 RESTRICTIONS/LIMITIATIONS

Basket or spring retainers may be needed for split-spoon sampling in loose, sandy soils.

Shelby tubes may not retain the sample in loose, sandy soils.

7.0 REFERENCES

American Society for Testing and Materials, *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils,* Standard Method D1586-99, 1999

U.S. Department of Energy, Hazardous Waste Remedial Actions Programs, *Quality Control Requirements for Field Methods*, DOE/HWP-69/R2, September 1996

U.S. Department of Energy, Hazardous Waste Remedial Actions Program, *Standard Operating Procedures for Site Characterizations,* DOE/HWP-100/R1, September 1996 or current revision.

U.S. Environmental Protection Agency, *Test Methods for evaluating Solid Waste, Physical/Chemical Methods (SW-846)* Third Edition, November 1986 (as amended by Updates I,II, IIA, IIB, III, and IIIA, June 1997) Method 5035 (**Note:** § 6.2.1.8 of this method says samples stored in En Core samplers should be analyzed within 48 hours or transferred to soil sample vials in the laboratory with 48 hours); December 1996, Revision O Closed-System Purge-and Trap and Extraction for Volatile Organics in Soil and Waste Samples.

Geoporbe Systems, *The Probe-Drive Soil Sampling System*, September 1991.

Geoporbe Systems, *Equipment and Tools Catalog*, 1992.

SOP 10

DECONTAMINATION OF FIELD EQUIPMENT

1.0 Objective

The objective of this standard operating procedure (SOP) is to describe the general procedures required of the contractor's employees for decontamination of field equipment at non-radioactive sites. This SOP serves as a guide and is applicable at most contaminated sites: however, it should be noted that site-specific conditions (i.e. type of contamination, type of media sampled) and the governing agency (i.e. United States Environmental Protection Agency [USEPA], Arizona Department of Environmental Quality [ADEQ], or Department of Energy [DOE]) may require modifications to the decontamination procedures provided in this SOP.

2.0 Background

2.1 Definitions

Analyte- Free Water- Tap water that has been treated so that the water contains no detectable heavy metals or other inorganic compounds. Analyte-free water should be stored only in clean glass, stainless steel, or plastic containers that can be closed when not in use.

Clean– Free of visible contamination and when decontamination has been completed in accordance with this SOP.

Cross Contamination- The transfer of contaminants through equipment or personnel from the contamination source to less contaminated or non-contaminated samples or areas.

Decontamination- The process of rinsing or otherwise cleaning the surfaces of equipment to rid them of contaminants and to minimize the potential for cross contamination of samples or exposure of personnel.

Organic-Free/Analyte-Free Water – Tap water that has been treated so that the water meets the analyte-free water criteria and contains no detectable organic compounds. Organic-free/analyte-free water should be stored only in clean glass, Teflon, or stainless steel containers that can be closed when not in use.

Potable Water- Tap water may be obtained from any municipal system. Chemical analysis of the water source may be required before it is used.

Soap – Low-sudsing, non-phosphate detergent such as Liquinox ™ and Alconox.

2.2 Discussion

Decontamination of field equipment is necessary to ensure acceptable quality of samples by preventing cross contamination. Further, decontamination reduces health hazards and prevents the spread of contaminants offsite.

3.0 Responsibilities

Field Team Leader – The field team leader (FTL) ensures that the field personnel are trained in the performance of this procedure and that decontamination is conducted in accordance with this procedure. The FTL may also be required to collect an document rinsate samples to provide quantitative verification that these procedures have been correctly implemented.

4.0 Required Supplies

- Stiff-bristle scrub brushes
- Plastic buckets, lids and troughs
- Soap, Liquinox ™
- Nalgene or Teflon sprayers or wash bottles or 2 to 5 gallon, manual-pump sprayer (pump sprayer material must be compatible with the solution used)
- Plastic sheeting
- Disposable wipes, rags, or paper towels
- Potable water
- Analyte-free water
- Organic-free/analyte free water
- Gloves, safety glasses and other protective clothing as specified in the site-specific health and safety plan
- High-pressure pump with soap dispenser or steam-spray unit (for large equipment only)
- Tools for equipment assembly and disassembly (as required)

5.0 Procedures

All reusable equipment (non-dedicated) used to collect handle, or measure samples will be decontaminated before coming into contact with any sample. Decontamination of equipment will occur either at a central decontamination station or at portable decontamination stations set up at the sampling location, drill site, or monitoring well location. The centrally located decontamination station will include an appropriately sized bermed and lined area on which equipment decontamination will occur and shall be equipped with a collection system and storage vessels. In certain circumstances, berming is not required when small quantities of water are being generated and for some short duration field activities. Equipment should be transported to the decontamination station in a manner to prevent cross-contamination of equipment and/or area. Precautions taken may include enclosing augers or rods in plastic wrap while being transported on a flatbed truck.

The decontamination area will be constructed so that contaminated water is either collected directly into appropriate containers (5-gallon buckets or steel wash tubs) or within the berms of the decontamination area that then drains into a collection system. Water from the collection system will be transferred into 55 gallon drums or portable tanks for storage. Typically, decontamination rinse water will be staged until sampling results or waste characterization results are

obtained, evaluated and the proper disposal of the waste is determined. The exact procedure for decontamination waste disposal should be discussed in the project specific Work Plan or Sampling and Analysis Plan (SAP).

All items that will come into contact with potentially contaminated media will be decontaminated before use and between sampling and/or drilling locations. If decontaminated items are not immediately used, they will be covered either with clean plastic or aluminum foil depending on the size of the item. All decontamination procedures for the equipment being used are as follows.

General Guidelines

- Potable, analyte-free, and organic free/analyte free water should be free of all contaminants of concern. Following the field plan, analytical data from the water source may be required.

- Decontaminated equipment will be allowed to air dry before being used.

- Documentation for all cleaning will be recorded in the logbook.

- Gloves, boots, safety glasses, and any other personnel protective clothing and equipment will be used as specified in the site-specific health and safety plan.

5.1 Heavy Equipment Decontamination

Heavy equipment includes drilling rigs and backhoes. Follow these steps when decontaminating this equipment:

- Establish a bermed decontamination area that is large enough to fully contain the equipment to be cleaned. If available, an existing wash pad or appropriate paved and bermed area may be used; otherwise, use one or more layers of heavy plastic sheeting to cover the ground surface and berms. All decontamination pads should be upwind of the area under investigation.

- With the rig/equipment in place, spray areas exposed to contaminated material (soils) using a hot water high-pressure sprayer. Be sure to spray down all surfaces, including the undercarriage.

- Use brushes, soap, and potable water to remove dirt whenever necessary.

- Remove equipment from the decontamination pad and allow it to air dry before returning it to the work site.

- Record the equipment type, date, and time and method decontamination in the appropriate logbook.

- After decontamination activities are completed, collect all contaminated wastewater, plastic sheeting, and disposable gloves, boots, and clothing in

separate containers or receptacles. All receptacles containing contaminated items must be properly labeled for disposal as detailed in the Work Plan or SAP. Liquids and solids must be drummed separately.

5.2 Downhole Equipment Decontamination

Downhole equipment includes hollow-stem augers. Drill pipes, rods, stems, etc. Follow these steps when decontaminating this equipment:

- Set up a centralized decontamination area, if possible. This area should be set up to collect contaminated rinse waters and to minimize the spread of airborne spray.

- Set up a “clean” area upwind of the decontamination area to receive cleaned equipment for air-drying. At a minimum clean plastic sheeting must be used to cover the ground, tables, or other surfaces on which decontaminated equipment is to be placed. All decontamination pads should be upwind of any areas under investigation.

5.3 Sampling Equipment Decontamination

- Set up a decontamination line on plastic sheeting. The decontamination line should progress from “dirty” to “clean”. A clean area shall be established upwind of the decontamination wash/rinse activities to dry the equipment. At a minimum, clean plastic sheeting must be used to cover the ground, table, or other surfaces that the decontaminated equipment is placed for drying.

- Disassemble any items that may trap contaminants internally. Do not reassemble the items until decontamination and air drying are complete.

- Wash the items with potable water and soap using a stiff brush as necessary to remove particulate matter and surface films. The items may be steam cleaned using soap and hot water as an alternative to brushing. Note that polyvinyl chloride or plastic items should not be steam cleaned. Items that have come into contact with concentrated and/or oily contaminants may need to be rinsed with a solvent such as hexane and allowed to air dry prior to the washing step.

- Thoroughly rinse the items with potable water.

- If sampling for metals, thoroughly rinse the items with an acid solution (e.g., 10 percent nitric acid) followed by a rinse using analyte-free water. If sampling for organic compounds, thoroughly rinse the items with solvent (e.g., isopropanol) followed by a rinse using analyte-free water. The specific chemicals used for the acid rinse and solvent rinse phases should be specified in the work plan. The acid rinsate and solvent rinsate must each be containerized separately. Acids and solvents are potentially hazardous materials and care must be exercised when using these chemicals to prevent adverse health affects (e.g., skin burns, irritation to the eyes and respiratory

system, etc.). Appropriate personal protective equipment must be worn when using these chemicals. These chemicals (including spent rinsate) must be managed and stored appropriately. Special measures such as proper labels, paperwork, notification, etc. may be required when transporting of shipping these chemicals.

- Rinse the items thoroughly using organic-free/analyte-free water.

- Allow the items to air dry completely.

- If large quantities of used decontamination solutions will be generated, each type of waste should be contained in separate containers.

- Unless otherwise required, plastic sheeting and disposable protective clothing may be treated as solid, nonhazardous waste.

- Waste liquids should be sampled, analyzed for contaminants of concern in accordance with disposal regulations, and disposed of accordingly.

6.0 Restrictions/ Limitations

Nitric acid and polar solvent rinses are necessary only when sampling for metals or organics respectively. These steps should not be used, unless required, because of the potential for acid burns and ignitability hazards.

If the field equipment is not thoroughly rinsed and allowed to completely air dry before use, volatile organic residue, which interferes with the analysis, may be detected in the samples. The occurrence of residual organic solvents is often dependent on the time of year sampling is conducted. In the summer, volatilization is rapid, and in the winter, volatilization is slow. Check with your USEPA region, state, and client for approved decontamination solvents.

7.0 References

American Society for Testing and Materials. 2002. Practice for Decontamination of Field Equipment at Nonradioactive Waste Sites, ASTM D5088-02. January 10.

Department of Energy. Hazardous Waste Remedial Actions Program. 1996. Standard Operating Procedures for Site Characterization, DOE/HWP-100/r1. September.

Exhibit D-3

Site Safety and Health Plan

DRAFT

Site Safety and Health Plan

Soil and Groundwater Monitoring
Munitions Treatment Range
Marine Corps Air Station
Yuma, Arizona

February 2025

Prepared for:
United States Department of the Navy
Naval Facilities Engineering Systems Command Southwest
750 Pacific Highway
San Diego, CA 92132

Prepared by:
Liberty Joint Venture
1851 W. 24th Street, Suite 101
Yuma, AZ 85364-6104

Prepared under:

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Attachment B Activity Hazard Analysis
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ACRONYMS AND ABBREVIATIONS

ACGIH.....American Conference of Governmental Industrial Hygienists
ACOE..... Army Corps of Engineers
ADEQ .....Arizona Department of Environmental Quality
AHA.....Activity Hazard Analysis
ANSI ..... American National Standards Institute
APP .....Accident Prevention Plan

°C .....degrees Celsius
CFR.....Code of Federal Regulations
COCs.....chemicals of concern
COPC ..... constituent of potential concern
CPR..... cardiopulmonary resuscitation
CRZ..... contamination reduction zone

dB..... decibel
DEET ..... N,N'-Diethyl-3-methylbenzamide
DFOW..... Definable Feature of Work
DOT .....Department of Transportation

EOD ..... Explosives Ordnance Disposal
EZ.....exclusion zone

°F..... degrees Fahrenheit

GI ..... gastrointestinal

HAZWOPER .....Hazardous Waste Operations and Emergency Response
HEPA ..... high efficiency particulate air
H&S .....Health and Safety

IV .....intravenous

LEL ..... Lower Explosive Limit

MCAS .....Marine Corps Air Station
MTR..... Munitions Treatment Range

NAVFAC SW ..... Naval Facilities Engineering Command Southwest
NIOSH ..... National Institute for Occupational Safety and Health
NRR ..... Noise Reduction Rating

OSHA..... Occupational Safety and Health Administration

PEL .....Permissible Exposure Level
PID .....photoionization detector
PM.....Project Manager
PPE..... personal protective equipment

RAC ..... risk assessment code

SHM.....Safety and Health Manager
SSHP.....Site Safety and Health Plan
SSHO ..... Site Safety and Health Officer
SVOC..... Semi Volatile Organic Compounds

TPH.....Total Petroleum Hydrocarbons

U.S. EPA..... United States Environmental Protection Agency
UXO..... Unexploded Ordnance

VOC .....volatile organic compound

1.0 INTRODUCTION

This Site Safety and Health Plan (SSHP) has been prepared in conformance with Title 29 Code of Federal Regulations (CFR) 1910.120 for the Munitions Treatment Range (MTR) scope of work at the Marine Corps Air Station (MCAS) Yuma, Arizona. This plan addresses on-site health and safety procedures intended to guide field activities at the project work site. This SSHP establishes procedures to protect workers and the public from potential hazards posed by work at this site, identifies chemical and physical hazards that may be encountered, and defines the duties of key personnel. This plan was prepared for Naval Facilities Engineering Command Southwest (NAVFAC SW).

Elements of this plan include personal protection, personnel and equipment safety, medical surveillance, air quality monitoring, and general on-site work practices. Additionally, this plan contains provisions for emergency response and first-aid. All personnel, including government employees, subcontractors, and third parties who enter the site work zones are required to comply with this plan. Additionally, all subcontractors must submit to the contractor a properly completed Activity Hazard Analysis (AHA) for review and approval prior to the start of on-site work.

This plan is based on the best available information and is intended for exclusive use by the contractor's employees and subcontractors working on the site. This plan will be maintained on site and may be amended should site conditions, procedures, or personnel change.

2.0 PROJECT DESCRIPTION

The scope of work for this project involves soil and groundwater monitoring at the MTR. The soil monitoring will consist of surface and subsurface sampling at the MTR within existing shotholes. Groundwater monitoring will consist of collecting groundwater samples from the monitoring well downgradient of the MTR. Soil and groundwater samples will be analyzed for the constituents of concern including:

- Metals- 6010B, 7470, and 7471
- Volatile Organic Compounds (VOCs)- 8260D
- Semivolatile Organic Compounds (SVOCs)- 8270
- Explosives- 8330
- White Phosphorus- 7580
- Nitrate/Nitrate- 353.3
- Ammonia- 350.2
- Perchlorate- 6850
- Total Petroleum Hydrocarbons (TPH)- 8015AZ Modified

Additional analytes may be added if Arizona Department of Environmental Quality (ADEQ) identifies a new regulated compound associated with explosives treated at the MTR, or if the United States Department of Defense begins to use a new compound for the manufacturing of explosives.

3.0 KEY PERSONNEL

3.1 Project Manager

The Project Manager (PM) will serve as the primary point of contact. PM responsibilities within the context of health and safety include documentation of site activities, implementation of emergency response, and verification of emergency action. In addition, the PM will ensure that personnel receive this plan, are familiar with the contents, and are aware of potential hazards associated with site or project operations.

3.2 Safety and Health Manager

The Health and Safety Manager (SHM) is responsible for preparation of the SSHP, and oversight of the project Site Safety and Health Officer (SSHO). The SHM has the authority to stop unsafe operations, remove unqualified personnel from the work area, and approve changes to the SSHP. The PM may request the SHM to act as the SSHO.

The SHM is responsible for integrating SSHP development and implementation. SHM duties include reviewing the SSHO implementation of the SSHP, advising the SSHO on health and safety issues, reviewing any site-specific plans for compliance and completeness, and establishing and monitoring health and safety procedures by conducting site safety audits.

3.3 Site Safety and Health Officer

The project SSHO duties include:

- Assuring that appropriate safety equipment is available and used according to this plan;
- Conducting safety monitoring and recording safety data;
- Contacting the base representative prior to the start of on-site work to verify methods for contacting all potential base emergency responders. Also, ensure that proper cellular telephone procedures are posted and readily available.
- Establishing the exclusion, decontamination, and support zones;
- Ensuring that everyone entering the site will sign the log-in/log-out form on a daily basis;
- Documenting accidents, incidents, and compliance issues;
- Initiating emergency response procedures when necessary, which includes establishing emergency communications with all emergency response organizations;
- Monitoring the effectiveness of personnel and equipment decontamination;
- Monitoring the effectiveness of the personal protective equipment (PPE); and
- Communicating the SSHP to site workers.

An initial kick-off meeting is planned prior to the start of field work. The health and safety section of the kick-off meeting will include a review of the SSHP by the SSHO with involved contractor personnel. The SSHP review will include the following site-specific topics: potential physical and chemical hazards, expected safe work practices, directions to nearest medical facility, and the site evacuation procedure.

Daily, the SSHO will conduct a safety meeting before the start of work. Daily meetings typically include:

- Site hazards;
- Symptoms and signs of over-exposure to site hazards;
- Physical, chemical, and toxic properties of constituents of potential concern (COPCs);
- Emergency recognition and prevention;
- Medical facilities available and their location;
- Site evacuation routes and refuge locations;
- Use and location of PPE and emergency equipment;
- Weather effects;
- Decontamination procedures;
- Duration of the work mission; and
- Site security and control measures.

Additionally, the SSHO's responsibilities include confirmation that personnel are fit for duty, coordination of emergency medical care, posting daily air monitoring results, conducting daily site safety inspections, and inspecting health and safety equipment. The SSHO documents PPE related failures to monitor the effectiveness of the PPE program.

The SSHO will investigate accidents and prepare an accident investigation report for the PM, who will forward it to appropriate regulatory agencies depending on the nature and severity of the accident or injury. Project safety inspections will be conducted daily by the SSHO and/or the PM.

The SSHO is responsible for on-site implementation and enforcement of the site safety program and procedures. The SSHO will oversee health and safety-related monitoring and will decide when action levels dictate more stringent protection.

3.4 Employee Safety Responsibility

Each employee is responsible for his or her own safety as well as the safety of others on the work site. The employee shall use equipment in a safe and responsible manner within the guidelines of the SSHP. All project personnel working at the site will be responsible for reading, understanding, and complying with the SSHP requirements. The contractor is ultimately responsible for the implementation of an effective safety and occupational health program. The Project Manager (PM), Safety and Health Manager (SHM), Project Certified Industrial Hygienist (CIH), and Site Safety and Health Officer (SSHO) are responsible for formulating and enforcing health and safety (H&S) requirements and implementing the SSHP.

All contractor personnel must conduct their businesses in compliance with governmental safety regulations and contractor company procedures. All the contractor H&S procedures will be implemented for all the contractor employees or subcontractor personnel.

3.5 Lines of Authority

The lines of authority are as follows:

3.5.1 Project Manager

The PM for this project has the overall responsibility for the project and to assure that the requirements of the contract are attained in a manner consistent with the SSHP requirements. The PM will coordinate with the SSHO to assure that the work is completed in a manner consistent with the SSHP.

3.5.2 Health and Safety Manager and Certified Industrial Hygienist

The SHM is responsible for reviewing the SSHP and ensuring that the SSHP is complete and accurate. The Project SHM provides technical and administrative support and will be available for consultation when required. If necessary, the SHM will direct modifications to specific aspects of the SSHP to adjust for on-site changes that affect safety. The SSHO will coordinate with the SHM on necessary modifications to the SSHP. The SHM may make periodic site visits to determine compliance.

3.5.3 Site Safety and Health Officer

The SSHO is authorized to administer the SSHP. The SSHO is authorized to stop work when an imminent health or safety risk exists. The SSHO will review the essential safety requirements with all on-site personnel and will facilitate the daily safety meetings.

The SSHO has a direct line of communication and authority from the SHM to implement site-specific H&S requirements for this project and is responsible for serving as the Competent Person as defined by 29 Code of Federal Regulations (CFR) 1926.32(f). Note: A review was performed and no additional standard specific competent person requirements apply to this scope of work. Responsible for daily site safety meetings; evaluating working conditions and making recommendations to PM and SHM to modify H&S procedures; inspecting all personal protective equipment (PPE) prior to use; enforcing all site-specific H&S procedures; and observing field team members for signs of exposure, stress, or other conditions related to pre-existing physical conditions and site work activities. No work will be performed unless the SSHO or a qualified alternate SSHO is present on the job site.

3.5.4 Field Team Leader

The Project Manager will take on the role of the Field Team Leader for this project. The Field Team Leader will work in concert with the Site Safety and Health officer to implement and enforce the SSHP.

3.5.5 Field Team Members

The Field Team Members are responsible for reviewing and following the SSHP, and reporting unsafe practices to the SSHO and/or PM.

3.6 Visitors

Site visitors are required to read the SSHP and sign the Site Log/Compliance Agreement Form. Visitors will comply with relevant Occupational Safety and Health Administration (OSHA) requirements and provide their own PPE required by the SSHP. Visitors who do not adhere to the provisions of the SSHP will be required to leave the work area. Visitors who have not met OSHA training and medical surveillance requirements are not permitted to enter investigation areas where there is elevated risk due to equipment operation or hazardous materials exposure. If a visitor not meeting the applicable OSHA requirements insists on entering the site, then all site work will cease until the unqualified visitor departs the designated work area.

4.0 HAZARD ANALYSIS AND RISK MITIGATION

The objective of the hazard analysis is to list the chemical, physical, and biological hazards that may be encountered on the site. Based on the hazard analysis review, risk mitigation will serve to promote the best possible effort to identify, control, or eliminate those site hazards that are selected for consideration.

AHAs will be used to document a risk analysis by which the steps (procedures) required to accomplish a Definable Feature of Work (DFOW) / activity are outlined and the actual/potential hazards of each step are identified. The AHAs identify potential safety, health, and environmental hazards associated with specific tasks and provide protective measures for personnel, the community, and the environment.

The risk assessment code (RAC) is determined for each activity and defined by probability and severity of occurrence. The RAC assigned to the entire activity is the highest RAC of all the steps in the AHA.

AHA's are intended to be created by the contractor field crews/workers performing the work, with the assistance of others (SSHO, SHM, FTL, etc.) as needed. No work will begin on a DFOW until the initial AHA has been accepted by the Government Designated Authority addressing the project-specific hazards. Once accepted, the AHA will be updated in the field by the field crews so that it constantly reflects current equipment, personnel, conditions, PPE, etc.

Work will not proceed on a particular task/phase until the AHA for that task has been reviewed with work crews. Before initiating any work activity that presents hazards not identified in the initial AHAs and to address the safety or health hazards derived from changed or unanticipated conditions, the PM and SSHO will amend the AHA as necessary to facilitate field documentation and address safety issues. Additions or changes to the AHAs, which are less conservative or allow for a downgrade in PPE requirements, will require written approval from the SHM. Government Designated Authority acceptance of changes made to an AHA is not necessary as long as changes do not increase original RAC level for the activity, as long as requirements are being met and a copy is made available upon request.

The following Activity Hazard Analyses (AHAs) have been prepared for the following general/baseline phases of work:

- Mobilization/Demobilization

- DPT Operations
- Environmental Sampling (Soil and Groundwater)

4.1 Chemical Hazards

Exposure pathways for potential contaminants that may be encountered during sampling tasks are directly related to the nature of tasks, principally the direct handling of samples, type of sampling equipment used, and effectiveness of project controls. Controlled work areas and methods are intended to mitigate potential exposures and uptake of contaminants; however, the potential still exists for exposure to contaminants that may be encountered.

Exposure pathways include:

- Inhalation - Respirable vapors or particulates present a direct route of entry for the contaminants.

- Skin absorption and contact with contaminated surfaces during sampling and contaminated material handling tasks that can be absorbed through unprotected skin or corrosion, resulting in skin irritation or potential absorption through the skin and/or skin contamination.

- Ingestion of contaminated materials adsorbed to dust particles or on surfaces resulting in potential uptake of contaminants through the gastrointestinal (GI) tract that may result in GI irritation, internal tissue irritation, and/or deposition to target organs.

- Injection while handling contaminated materials by breaking of the skin, or migration through an existing wound, resulting in localized irritation, contamination, uptake of soluble contaminants, and deposition of insoluble contaminants.

Airborne exposure is considered to be a potential exposure pathway at the site from inhalation of particulates or vapors originating from sampling activities. The potential for inhalation of chemicals of concern (COCs) exists from volatilization from soil, and/or groundwater during field activities. Based on concentrations of COCs previously detected in the vicinity of the project area, and the nature of the tasks that will be completed, the potential for exposure is anticipated to be minimal. Airborne exposure to personnel outside the exclusion zone is not likely to occur based on the type of work conducted, anticipated concentration of the COCs, and dispersion through air.

Air monitoring, to determine if flammable, explosive atmospheres or personal hazards are being generated at the time of field activities, will be conducted onsite if required by the SSHO or SHM.

To mitigate potential chemical hazards at the site, recommended controls in the AHAs must be implemented (Attachment B). In addition, personal protective equipment (Section 5.5) and air

monitoring equipment must also be utilized to evaluate airborne concentrations and protect workers.

4.1.1 Exposure Pathways

Identification of COC exposure pathways is based on distinguishing those routes that chemical constituents may take to affect various environmental media. Human exposure potential can be evaluated once a constituent is in an environmental medium. The potential media of concern includes soil, water and air. Applicable routes of exposure include direct skin contact, ingestion and inhalation.

Direct skin contact with COCs is unlikely during planned field activities. Contact with contaminants will be limited or prevented by wearing safety glasses and protective gloves during media handling, sampling and decontamination activities.

To reduce the possibility of ingestion of COC, no eating or drinking will be allowed within the exclusion or contaminant reduction zones. Similarly, no eating, drinking, or smoking will be allowed in the support zone unless hands are washed using soap and water.

Based on the hazard analysis, chemical hazards do exist and recommended controls must be employed to prevent these hazards from occurring [see AHAs, Attachment B]. During drilling activities, PPE (Section 5.5) will be used to protect workers.

4.2 Physical Hazards

The hazard analysis has identified physical hazards associated with the execution of this project. These include operational problems as well as potential for accidents and personal injury, and are presented in the AHA (Attachment B). The AHA describes the recommended controls that must be employed to minimize the impact of the existing hazards.

4.2.1 Heat Stress

Working in hot conditions or performing hard work in any temperature creates a great deal of heat stress on personnel who are not wearing chemical protective equipment. Additional layering of PPE creates a vapor barrier, entrapping body heat and (otherwise) evaporated sweat. All personnel should carefully monitor their own physical condition while working. In addition, supervisory personnel will direct/perform heat stress monitoring as described in Section 4.3.1.1. Work levels can increase as each individual becomes acclimatized.

Over exposure to heat from work stress, ambient temperature, and radiant heat can cause a variety of ill effects, ranging from cramps to fainting, to possible death. Employees need to assess the exposure and recognize the signs and symptoms of heat stress so they can take preventive measures. Drinking water, electrolyte fluids, protective clothing, and regular rest breaks in a cool area need to be available and used to prevent serious effects of overexposure. Heat stress can be serious. The major effects are described briefly in the following paragraphs and in detail later in this section, including symptoms and treatment.

Heat cramps are muscle spasms, caused by depletion of salt from excessive sweating, without replacement of the lost salt. Under extreme exposures, salt loss may be as much as 6 to 8 teaspoonfuls in 1 day.

Fainting, due to heat exposure, occurs when the body adapts to excess heat by dilating blood vessels in the skin and superficial muscles in order to deliver warm blood to the surface of the

body where the excess energy can be delivered back to the environment. The expansion of the superficial blood vessels allows a greater than normal proportion of the circulating blood volume to be away from the central circulation (which supplies, among other organs, the brain). This lack of sufficient central pressure is worsened when a person is on his/her feet for a prolonged period of time, as gravity allows a significant blood volume to collect in the lower extremities. Combined with fatigue and mild dehydration, the diversion of blood leads to a fainting episode, as not enough blood (with oxygen and glucose) is pumped to the brain.

Heat exhaustion can result from excess loss of water and salt, and affected persons may collapse from dehydration or inadequate circulation. There is heavy sweating, little or no increase in body temperature, and a rapid pulse, up to 150 beats per minute.

Heat stroke is an extreme failure of the body thermoregulatory system, with hot, dry skin, flushed face, rapid breathing, pounding pulse, and high body temperature greater than 104°F. Continuous exposure to extreme heat for as little as 3 hours can produce heat stroke. Brain disorders may range from headache to delirium to unconsciousness. Rapid cooling is urgent to prevent death.

Other factors that may magnify harmful effects of heat exposure are chemical exposures, altitude, inadequate acclimatization, fatigue, lack of sleep, consumption of alcohol, inadequate nutrition, cardiac and respiratory conditions, and taking certain medications.

4.2.1.1 Heat Stress Monitoring

Because the incidence of heat stress depends on a variety of factors, all site workers, even those not wearing protective equipment should be monitored. Physiological monitoring of site workers required to wear semi-permeable or impermeable clothing will be conducted when ambient temperatures reach 70 degrees Fahrenheit (°F) or above. Heat stress monitoring may include the following:

Heart Rate. Count the radial pulse for 30-seconds while the site worker is at rest.

- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

Oral Temperature. Use a oral thermometer with a disposable probe cover (3 minutes under the tongue) or a similar device (aural or temporal heat sensor) will be used to measure the oral temperature of the site worker at the end of the work period (before drinking).

- If the oral temperature exceeds 99.6°F [37.6 degrees Celsius (°C)] shorten the next work cycle by one-third without changing the rest period.
- If the oral temperature exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one-third.
- Do not permit a site worker to wear a semi-permeable or impermeable garment when his/her oral temperature exceeds 100.6 °F (38.1°C).

4.2.1.2 Preventive Measures

In hot environments where heat stress may be severe, the following recommendations should be considered for the protection of personnel:

- Drinking water will be made available to all personnel. The consumption of water should be encouraged, and it is recommended that frequent small amounts be consumed such as 1 cup every 15-20 minutes. The water will be cool drinking water and not ice cold.
- Work/rest regiment should be adjusted in accordance with the temperature and to allow each worker to properly acclimate to the site conditions.
- Breaks taken in an air conditioned or shaded cool area will reduce the heart rate and allow for a greater margin of safety in preventing heat stress conditions.
- Employees should be trained in the recognition of the signs and symptoms of heat stress.
- It is imperative that treatment begin immediately if symptoms and signs of severe heat stress are present.
- Wear head covering and loose fitting, absorbent clothing, preferably cotton, to assist evaporation.
- If possible, schedule strenuous work and hot work in cooler part of the day.

4.2.1.3 Heat Cramps

Heat cramps can be caused by working in a hot environment and not replenishing fluids or electrolytes being lost while sweating.

Symptoms:

- Spasms (cramps) of the skeletal muscles.

Treatment:

- Drink water and electrolyte solutions. With proper fluid and electrolyte replacement, heat cramps may be prevented. Salt tablets are not to be used.
- General motion, stretching, and massage of the affected muscles should relieve the cramps.
- If symptoms are not relieved or if spasms are severe and multiple, transport to the nearest doctor for possible saline intravenous (IV).

4.2.1.4 Fainting

A victim who has suffered a fainting episode in the heat should be examined for any head or neck injuries, as well as other possible breaks or cuts. Other causes of fainting must be considered (low blood sugar, abnormal heart rhythm, etc.). If fainting is due to the heat, the victim will reawaken shortly, as the horizontal position returns blood to the brain and solves the major problem. In general, body temperature is not elevated.

Symptoms:

- Warning signs of a fainting spell include dizziness, lightheadedness, nausea, weakness, sweating, blurred vision, or seeing flashing lights.

Treatment:

- At the onset of symptoms, immediately assume a horizontal position or sit and lower the head between the knees.
- If fainting has occurred, the victim should be rested in a horizontal position for 15 to 30 minutes.
- Drink water and electrolyte solution (1 or 2 pints).

4.2.1.5 Heat Exhaustion

Heat exhaustion can develop after several days of exposure to high temperatures and inadequate or unbalanced replenishment of fluids. If untreated, heat exhaustion may progress to heat stroke if sweating ceases.

Symptoms:

- Skin clammy and moist, pale, muddy, or flushed.
- Oral temperature can be below the normal 98.6°F.
- The pulse may be weak with the blood pressure low, causing fainting, especially upon standing after sitting.
- Brain will be rational, but may have a headache.
- General symptoms are extreme fatigue, weakness, giddiness, and nausea. Any one symptom or all symptoms may be present.

Treatment:

- Remove and protect from sunlight and other heat sources.
- Removal all PPE from the victim and loosen clothing.
- Place the victim in a supine position with feet slightly elevated.
- Provide electrolyte solution to replenish both the salt and fluids lost from sweating.
- Provide cold water to drink and pour over face and head.
- Evacuate to cool, preferably air conditioned room.
- Transport to definitive medical care.
- Recovery typically occurs within 1 to 5 days if properly treated.

4.2.1.6 Heat Stroke (Sunstroke)

Heat stroke can occur during environmental heat exposure with lack of thermoregulation. Heat stroke may be fatal unless treated promptly and adequately (vigorously).

Symptoms:

- Skin is hot and dry, red, mottled, or cyanotic (gray to blue).
- Oral temperatures of 104°F and above.
- Heart pounding and rapid.
- The worker may become confused, delirious, unconscious, or comatose, either slowly or rapidly.

-

Treatment:

- Call for immediate ambulance support.
- Remove and protect from sunlight and other heat sources.
- Remove all PPE and clothing from the victim as decency permits.
- It is essential that treatment begin immediately. Rapid cooling of the body is imperative.
- Place ice packs, if available, on the forehead, behind the neck, and groin areas.
- Shade the victim from sun and any other heat source.
- Evacuate to a safe area, or if evacuation is delayed, initiate additional treatment before reaching a safe area.
- If possible, wrap the unclothed body in wet sheets and fan vigorously with cool, dry air.
- If wrapping in sheets is not feasible, fan the victim vigorously (use an electric fan if available).
- Place the victim flat on their back, or slightly elevate their head/shoulders.
- Give the victim sips of cool water, if they are conscious, coherent, and not nauseated/or vomiting.
- Sponge the victim cool water and/or to lightly spray with water (avoiding the face), while fanning the victim.
- Protect the victim from further injury if they convulse while awaiting ambulance transport by; removing obstacles that might be struck by the victim during the course of the convulsions, and placing a soft, rolled up piece of cloth or clothing between the victims teeth to prevent damage to the tongue.

4.2.2 Utility Hazards

To minimize potential hazards posed by underground and overhead utilities within the project area, the following policies and procedures will be implemented:

- All applicable utility clearance permits will be obtained and approved from base personnel and/or utility companies prior to initiating intrusive operations.
- A utility survey will be conducted to identify the location of underground and overhead utilities in the vicinity of any drilling locations.
- All available utility maps will be kept onsite at all times during drilling activities.

4.2.3 Hand Tool and Equipment Hazards

To minimize the potential of hazards associated with the use of hand tools and other equipment during field activities, the following policies and procedures will be implemented:

- All hand tools and equipment will be inspected for wear and tested for proper function prior to use.
- All maintenance records for applicable equipment will be reviewed prior to use to ensure that all scheduled maintenance has been performed.

- Good housekeeping practices will be used.
- Adequate work space will be established before operating all hand tools or equipment.
- Only trained, qualified personnel will be assigned to operate individual equipment.
- Contractor personnel will not handle any subcontractor owned tools or equipment.

4.2.4 Slip, Trip and Fall Hazards

To minimize the potential for slips, trips and falls, the following procedures will be implemented:

- Tree branches, vegetation, rocks and other ground hazards will be cleared from around each boring location.
- Good housekeeping practices will be used.
- Appropriate foot protection (i.e. steel-toed boots) will be worn at all times to help prevent slips and trips.
- Extreme caution will be used when working on uneven and/or wet surfaces.

4.2.5 Noise Hazards

Potential noise hazards exist during drilling operations and pilot study activities. Hearing protection (i.e. approved earplugs, earmuffs or both) will be used by all the contractor field personnel and subcontractors whenever noise measurements in excess of 85 decibels (dB) are identified, either by documentation or monitoring. Hearing protection and noise monitoring requirements are described in Section 5.7.

4.3 Biological Hazards

The various biological hazards present at this site are described below. The recommended controls that must be implemented to minimize the impacts of these hazards are detailed in the AHA (Attachment B)

4.3.1 Insects, Snakes, and Animal Bites

Bees and spiders pose the most common biological hazard encountered during field work. Less frequent hazards are snakes and various other animals. Spiders thrive in the warm, wet environments of well casings and vault enclosures while snakes and other small animals may be found under rocks, plastic sheeting, tires, and other natural and man-made items that offer shelter.

Rattlesnakes must be avoided at all times. A sharp rattling sound may indicate a rattlesnake's presence. If a rattlesnake is encountered, workers should immediately leave the area and seek outside help to deal with the creature. If a rattlesnake bite does occur, the victim should be transported to the nearest medical facility as quickly as possible.

The protocol for mitigating biological hazards will begin with the SSHO identifying personnel with known allergic reactions to insect bites or stings, and notifying field supervisors prior to project assignment.

Though animal bites, insect stings, and ticks can cause localized swelling, itching, and minor pain that can often be handled by first aid treatment, sensitized individuals can experience more serious effects such as anaphylactic shock. This type of shock can lead to severe reactions in the

circulatory, respiratory, and central nervous system, and in some cases, death. In consideration of this potential, all cases of stings and bites will be handled as an emergency that requires medical attention. In the event of an animal bite, no attempt should be made to capture the animal.

4.3.2 Hantavirus and Arenavirus

Animal and bird droppings often contain mold, fungus, or bacteria posing a significant respiratory hazard that can cause lung diseases and allergies. Hantavirus and arenavirus are known to be transmitted by exposure to rodent droppings. Rodents shed the virus in their saliva, urine, and feces. Particles and droplets containing the virus can become airborne, spreading the virus as humans breathe the contaminated air.

Employees required to enter areas inhabited by wild animals will be instructed not to touch animal droppings, and to wear, at a minimum, gloves and protective full-body suits (i.e., Tyvek®). Good hygiene practices will help to minimize the potential for exposure to these hazards.

4.3.3 West Nile Virus

West Nile virus is primarily transmitted among wild birds by infected mosquitoes. The infected mosquitoes can also transmit the virus to humans, causing a mild flu-like illness that typically lasts for a few days. In rare cases, the virus can cause encephalitis, which is an inflammation of the brain.

The following precautionary measures against West Nile virus are included for field personnel:

- Maximize skin coverage using long sleeves;
- Apply an insect repellent containing N,N'-Diethyl-3-methylbenzamide (DEET) to thin clothing and exposed skin; and
- Avoid those times of day when mosquitoes are most active (dawn and dusk).

4.4 Task-Specific Hazard Analysis and Recommended Controls

The task-specific hazard analysis is conducted prior to the start of the project and is based on available information. The hazard analysis will be revised as needed, depending on work conditions and as additional requirements are identified. Any changes to the hazard analysis will be noted in the field copy of the SSHP. Notations will include project instructions provided to on-site workers and the date and time that changes were made. The AHA is available as Attachment B.

5.0 General Health and Safety Requirements

5.1 Medical Monitoring of Personnel

The contractor's Medical Surveillance Program is directly supervised by a licensed physician board certified in occupational medicine and incorporates medical monitoring. The medical monitoring of all the contractors work force personnel is determined based on the results of industrial hygiene surveys, prior site characterization, and is exposure driven. In the absence of industrial hygiene data, medical personnel will make a decision on placement in medical surveillance programs based on knowledge of the workplace, job requirements and review of employee's occupational history. If necessary, physicals or stressor-specific evaluations will be

performed by a qualified physician board certified in occupational medicine. Subsequent exams are performed as frequently as medical authorities determine is necessary for the safety of the individuals involved. The contractor medical consultants will determine the content of the physical.

5.2 Restricted Access Work Zone

Regulated areas: For this project, the work area may include three separate zones: an exclusion (or "hot") zone, a contamination reduction (decon) zone (CRZ), and a support zone. The work areas have not been predetermined or mapped; however, they will be identified at the start of each day and as the active work areas migrate across the project site. Additionally, the restricted access zones may be affected by a significant change from the typical westerly wind direction.

5.2.1 Exclusion Zone

The exclusion zone (EZ) includes the area in the vicinity of well installation and sampling activities. Employees will use appropriate personal protective equipment PPE when working in those areas. The exclusion zone will be defined as an area where there is a possible respiratory or contact health hazard. In most instances, this area will be defined by a 10-meter or less radius from the operating equipment. Cones, yellow caution tape, or other appropriate delineation will identify the location of exclusion zones. Personnel entering the EZ must log in and log out from the site.

5.2.2 Contamination Reduction Zone

Personnel entering or leaving the exclusion zone will pass through the contamination reduction zone for accountability and to confine contamination. Decontamination of personnel and equipment will be performed at designated locations within the contamination reduction zone. Personal protective outer garments and respiratory protection will be removed in the contamination reduction zone, secured, and properly labeled. The contamination reduction zone is defined as the limit of the exclusion zone for this project.

5.2.3 Support Zone

The support zone consists of an area outside the contamination reduction zone. The support zone will be located to minimize potential contaminant exposure. Eating and drinking will be permitted in the support area only after washing face and hands.

All site visitors entering the site EZ/CRZ are required to sign the Accident Prevention Plan (APP) Acknowledgement Sheet.

5.3 Work Limitations

Work limitations include the following:

- Work is to be conducted during daylight hours except in an emergency.
- Eye protective equipment must be worn by all persons when sight hazards exist.
- Drilling operations will be performed under the guidance of a unexploded ordnance (UXO) specialist, and a magnetometer will be used to monitor for UXO at all times.

5.4 Safety Orientation Meeting

Field personnel must attend a safety orientation meeting before the start of field work. The meeting will be scheduled and conducted by the PM, SHM, and the SSHO. The meeting will include but is not limited to the anticipated scope of work review of the following health and safety topics:

- SSHP review;
- Site hazards;
- Symptoms and signs of over-exposure to site hazards;
- Physical/chemical/toxicological properties of the COPCs;
- Emergency recognition and prevention;
- Medical facility locations;
- Evacuation routes and refuge locations;
- Use and location of PPE and emergency equipment;
- Weather effects;
- Decontamination procedures;
- Duration of the work mission; and
- Site security and control measures.

5.5 Personal Protective Equipment

Field personnel will be equipped with PPE appropriate for the hazardous material being handled and the nature of the work being completed. The levels of personal protective equipment to be used for work tasks have been selected based on known or anticipated hazards and expected concentrations of materials found on the site. Personnel conducting site activities in Level D will wear the following:

- Steel-toed boots;
- Long pants and long sleeved shirt;
- Reflective safety vest (when appropriate);
- Hearing protection; earplugs and earmuffs with a Noise Reduction Rating (NRR) of 28 decibels (dB) or greater (when appropriate);
- Chemical-resistant safety glasses (when appropriate); and
- Hard hat (when appropriate).

Level D protective equipment will be modified to include additional protective equipment where skin contact with contaminants is possible. Disposable chemical resistant nitrile gloves will be worn when there is potential for contact with the known or suspected contamination. Modified Level D will be required if there is potential for splashes from contaminated liquid.

5.6 PPE Program

Based on an evaluation of the potential site-specific hazards that may be encountered during execution of field activities, this project requires that all site workers be dressed in modified level D protection including: nitrile outer gloves (when handling sampling equipment), safety glasses, hearing protection (during drilling operations), hard hat, steel toe shoes, and long pants. However, when handling powdered grout, cement, or granular carbon materials, workers will be required to

wear air purifying respirators equipped with high efficiency particulate air (HEPA) filters. All PPE will be properly stored on site in the field support vehicles when not in use and inspected in accordance with the manufacturer's recommendations prior to the start of each application to insure that the integrity of each item is sufficient for its intended use. All PPE not in full and complete working order will be repaired to full function before use, or replaced. Expiration dates on all disposable PPE, such as nitrile gloves, will be examined prior to the start of fieldwork. Expired PPE will be disposed of immediately. Donning and doffing of PPE will be performed in accordance with the manufacture's recommendations, as applicable.

5.7 Hearing Protection

Hearing protection (i.e. approved earplugs, earmuffs, or both) will be used by all the contractor field personnel and subcontractors whenever noise measurements in excess of 84 decibels (dB) are identified, either by documentation or monitoring. Field activities are not anticipated to generate noise levels in excess of 85 dB. As a result, hearing protection will not be required for the field activities.

If noise monitoring is necessary, a sound level meter (Type 2 or higher) or noise dosimeter will be utilized. Noise levels will be measured with the instrument's microphone placed within the monitored employee's hearing zone; an approximate two-foot diameter sphere surrounding the head, upon initiation of the task to be monitored. The instrument will be set to the A-weighted scale and on slow response. When using a dosimeter, it will be set at a 3 dB exchange rate with the threshold level set at 80 dB. The criterion level (allowable dose) will be set at 85 dB. Noise monitoring exposure limits are provided in Section 6.0.

5.8 Safety Equipment and Materials

The contractor field personnel shall ensure the following safety equipment and materials are readily available at each work site:

- Emergency eyewash unit meeting the requirements of American National Standards Institute (ANSI) Standard Z358.1-2009
- First-aid kit;
- Fire extinguisher (20 pound ABC-rated type); and
- Photoionization detector (PID).

6.0 EXPOSURE MONITORING

Safe work practices during field work will be used to sufficiently to protect field personnel against exposure to airborne hazardous substances. If deemed necessary by the SHM, a PID and Lower Explosive Limit (LEL) meter may be used during sampling activities to ensure that hazardous conditions are not present. If measurements exceed background levels, workers will be verbally notified immediately, and actions will be taken by the SSHO to stop work and reevaluate activities.

7.0 HAZARD TRAINING

The OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements, as described in Title 29 CFR §1910.120, apply to those persons conducting field work. The regulation states that all personnel involved in characterization or remediation of an

uncontrolled hazardous waste site shall be required to have 40 hours of certified training and three days of supervised field experience. In compliance with Title 29 CFR §1910.120, the contractor's protocol requires "general site workers," those individuals performing field activities, to have completed the appropriate OSHA HAZWOPER training course.

Personnel who are on site to perform occasional inspection and sampling activities and are unlikely to experience exposure over the permissible exposure limit (PEL) and published exposure limits, may be considered "workers on site only occasionally for a specific limited task." These workers must have 24 hours of training and one day of actual field experience. Employees who have minimal (low risk) exposure or low probability of exposure to hazardous substances are covered by other OSHA standards, such as the Hazard Communication Standard, Title 29 CFR §1910.120.

Training related actions that will be followed during the course of this project include a set of regulatory procedures, a pre-deployment "kick-off" meeting prior to the start of work, and daily on-site safety meetings.

Regulatory procedures related to training will consist of the presence of at least one supervisor having received the OSHA 8-hr Hazardous Waste Supervisor training who will be on-site at all times[1]. All the contractor site workers will be 40-hour trained and will meet the minimum standard for experience[2]. All of the contractor's employees have been trained in first aid, cardiopulmonary resuscitation (CPR), and bloodborne pathogen awareness[3]. At least two of the contractor's personnel will be properly trained and certified in adult first aid and CPR and trained in bloodborne pathogen awareness and will be on-site at all times work is being performed. All employees have been trained in proper donning and doffing procedures through the 40-hour HAZWOPER course and refresher training is current.[4]

Copies of current OSHA training and medical clearance documents for all assigned site personnel (contractor and subcontractors) will be available on-site at all times during field work. Upon request, copies of these documents will be provided via fax, hand-delivery, or other means.

The pre-deployment "kick-off" meeting will address and review, among other issues, the identification of the chemical/physical/toxicological properties of each substance[5]; the chemical, physical, and toxicological hazards as identified in the SSHP; and the limitations and use of PPE, as presented in the HAZWOPER 40-hour training course.

An on-site "tail-gate" meeting will include a walk-through of safety procedures that will be followed during the project.

Daily safety meetings will be conducted to review issues such as symptoms and signs of overexposure to chemical hazards as presented during 40-hour HAZWOPER training[6].

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[1] Regulatory reference: Title 29 CFR §1910.120(e)(4), §1926.65(e)(4); NAVFAC IR Manual Chapters 11.4 and 11.9; and ACOE EM-385-1-1 §28A.02(b)(4)(b).
[2] Regulatory reference: Title 29 CFR §1910.120(e)(3)(i), §1926.65(e)(3)(i); NAVFAC IR Manual Chapter 11.4; and ACOE EM-385-1-1 §28A.02(b)(4)(a)(iii).
[3] Regulatory reference: Title 29 CFR §1926.50(c), §1910.1030; and ACOE EM-385-1-1 §28.A.02.b(13).
[4] Regulatory reference: Title 29 CFR §1910.120(e)(8), §1926.65(e)(8): NAVFAC IR Manual Chapters 11.4 and 11.9; and ACOE EM-385-1-1 §28A.02(b)(4)(a)(ii).
[5] Regulatory reference: Title 29 CFR §1210.120(c)(8), §1926.65(c)(8); and ACOE EM-385-1-1 §28.A.02.b(4)(c).
[6] Regulatory reference: Title 29 CFR §1910.120(c)(8), and ACOE EM-385-1-1 §28.A.02(b)(4)(a)(1).

8.0 STANDARD WORK PROCEDURES

Field activities are described in the work plan and will be discussed at the daily safety meeting.

8.1 Area Marking

Cones, or construction barricades and/or yellow caution tape will bound field activities, including but not limited to the exclusion zone.

8.2 Heavy Equipment Operation

Drilling equipment will be in operation at this site during field work.

8.3 Safe Work Practices

Safe work practices for site activities include the following:

- Site personnel will enter a designated exclusion zone only through the CRZ. Personnel leaving an exclusion zone must exit through the CRZ and undergo decontamination.
- Only vehicles and equipment necessary to complete work tasks will be permitted within the exclusion zone. All nonessential vehicles and equipment will remain within the support zone.
- Containers (such as drums) will be moved only with the proper equipment and will be secured to prevent dropping or loss of control during transport.
- Site personnel will avoid contact with potentially contaminated substances. Walking through puddles or mud and kneeling on the ground will be avoided whenever possible.
- Food and beverages, use of tobacco products, and application of cosmetics will not be permitted in the exclusion zone.
- Site personnel will be required to wash their hands and faces before eating, drinking, smoking, or applying cosmetics.
- A "buddy" system will be used. Site workers will observe each other for signs of toxic exposure and heat or cold stress. Indications of adverse effects include but are not limited to: changes in complexion and skin discoloration; changes in coordination or demeanor; excessive salivation and papillary response; and changes in speech patterns. Additionally, workers will inform each other of non-visual effects of illness, such as: headache, dizziness, nausea, blurred vision, cramps, and irritation of eyes, skin, or respiratory tract.

9.0 COMMUNICATION PROCEDURES

The SSHO is assigned the responsibility to establish communications with all potential emergency response organizations prior to starting on-site work. Additionally, prior to start of on-site work, the SSHO, while identifying and establishing emergency points of contact, will also confirm and alert the nearest emergency medical facility capable and willing to deal with potentially chemically contaminated and/or seriously injured workers

Cellular phones will be present on the site while work is in progress for emergency and logistical assistance. Wireless service is available and adequate on site.

Personnel in the exclusion zone should remain in regular contact (daily before and after work commences) with either the PM, SHM, or SSHO. A failure of communication requires an immediate re-establishment of communication or cessation of work until communications can be restored.

A single 15-second long horn blast is the emergency signal that site personnel should leave the exclusion zone.

The following standard hand signals will be used in case of radio communication failure:
- Hand gripping throat: Out of air, can't breathe
- Grip partner's wrist: Leave area immediately
- Hands on top of head: Need assistance
- Thumbs up: Ok, I understand, am all right
- Thumbs down: No, negative

10.0 DECONTAMINATION PROCEDURES

The equipment decontamination procedures described in the following sections are based on guidelines appropriate for low-level contamination. When appropriate, Liquinox or Alconox cleaning solutions and deionized water rinses will be used to decontaminate equipment. Wastewater generated by equipment decontamination activities will be stored in 55-gallon containers or Department of Transportation (DOT) approved containers. The PM will label the wastewater and will arrange for this investigation-derived waste to be transported to an authorized disposal facility.

10.1 Reusable Equipment

Reusable equipment will be decontaminated before and after each use. Deionized water will be used for the following sampling equipment decontamination procedures:

- Scrub the equipment with a brush in a bucket containing Liquinox or Alconox solution and potable, distilled water.
- Triple-rinse the equipment with distilled water and allow it to air dry.
- Reassemble the equipment and place it in a clean area on plastic or aluminum foil. If aluminum foil is used, wrap the equipment with the dull side of the aluminum foil toward the equipment.

10.2 Personnel

Remove and bag disposable chemical-resistant gloves and clothing (i.e., Tyvek) in a plastic trash bag. If cotton coveralls are used, bag and wash prior to re-wearing. Field workers will be instructed to wash hands and face using soap and water and to take a shower and wash hair as soon as possible after leaving the site.

10.3 Investigation-Derived Waste

No investigation derived wastes are anticipated to be generated during field work.

11.0 CONFINED SPACE ENTRY

The tasks for this project do not involve confined-space entry.

12.0 UPDATES OF HEALTH AND SAFETY PLAN

Updating of this Health and Safety Plan shall be done as frequently as necessary to ensure safe work conditions. Suggestions should be brought to the attention of the PM, SHM, or SSHO. If unforeseen situations arise, this plan will be updated accordingly.

13.0 EMERGENCY ACTION PLAN

This Emergency Action Plan (EAP) has been prepared to comply with 29CFR1910.38. The purpose of the EAP is to facilitate and organize actions during emergencies. The elements of the EAP are described in detail below.

13.1 Means of Reporting Fires and Other Emergencies

In the event of a fire or explosion at the site, the Fire Department will be contacted as soon as possible, and evacuation of the site will begin immediately. Emergency phone numbers are included as Attachment C.

13.2 Evacuation Procedures and Emergency Escape Route Assignment

Workers will evacuate the exclusion zone by the most expedient route available, preferably through the contamination reduction zone. In the event site evacuation is necessary, the evacuation meeting location will be described at the daily tailgate meeting. The emergency meeting location(s) are illustrated on the Site Map (Attachment A). In all situations when an emergency results in the evacuation of the exclusion zone, personnel must not re-enter until:

- The conditions causing the emergency have been corrected.
- The existing hazards have been reassessed.
- The SSHP has been reviewed.
- Site personnel have been briefed on any changes to this SSHP.
- The route to the medical facility is included as Attachment D.

13.3 Procedures to be Followed by Employees Who Remain to Operate Critical Plant Operations Before They Evacuate

Employees are not required to remain on site during evacuation procedures.

13.4 Procedures to Account for all Employees after an Emergency Evacuation has been Completed

In the event of an evacuation, the SSHO will be responsible for ensuring that all personnel evacuated the site. The SSHO will account for all personnel at one of the meeting location illustrated in Attachment A. The meeting location will be discussed each day in the tailgate meeting.

13.5 Rescue and Medical Duties for Those Employees Who are to Perform Them

Rescue and medical duties will be performed by the fire department. Emergency phone numbers are provided in Attachment C.

13.6 Names or Job Titles of Persons Who can be Contacted for Further Information or Explanation of Duties under the Plan

Additional information or clarification of some aspects of the plan may be obtained by contacting the SHM assigned by the contractor.

14.0 REFERENCES

Department of the Navy, 2006. Environmental Restoration Program Manual, August.

National Institute for Occupational Safety and Health (NIOSH), OSHA, United States Coast Guard, United States Environmental Protection Agency (U.S. EPA), *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, Department of Health and Human Services Publication No. 85-115, October 1985.

Navy Environmental Health Center, 2007. *Medical Surveillance Procedures Manual and Medical Matrix (Edition 9).* August.

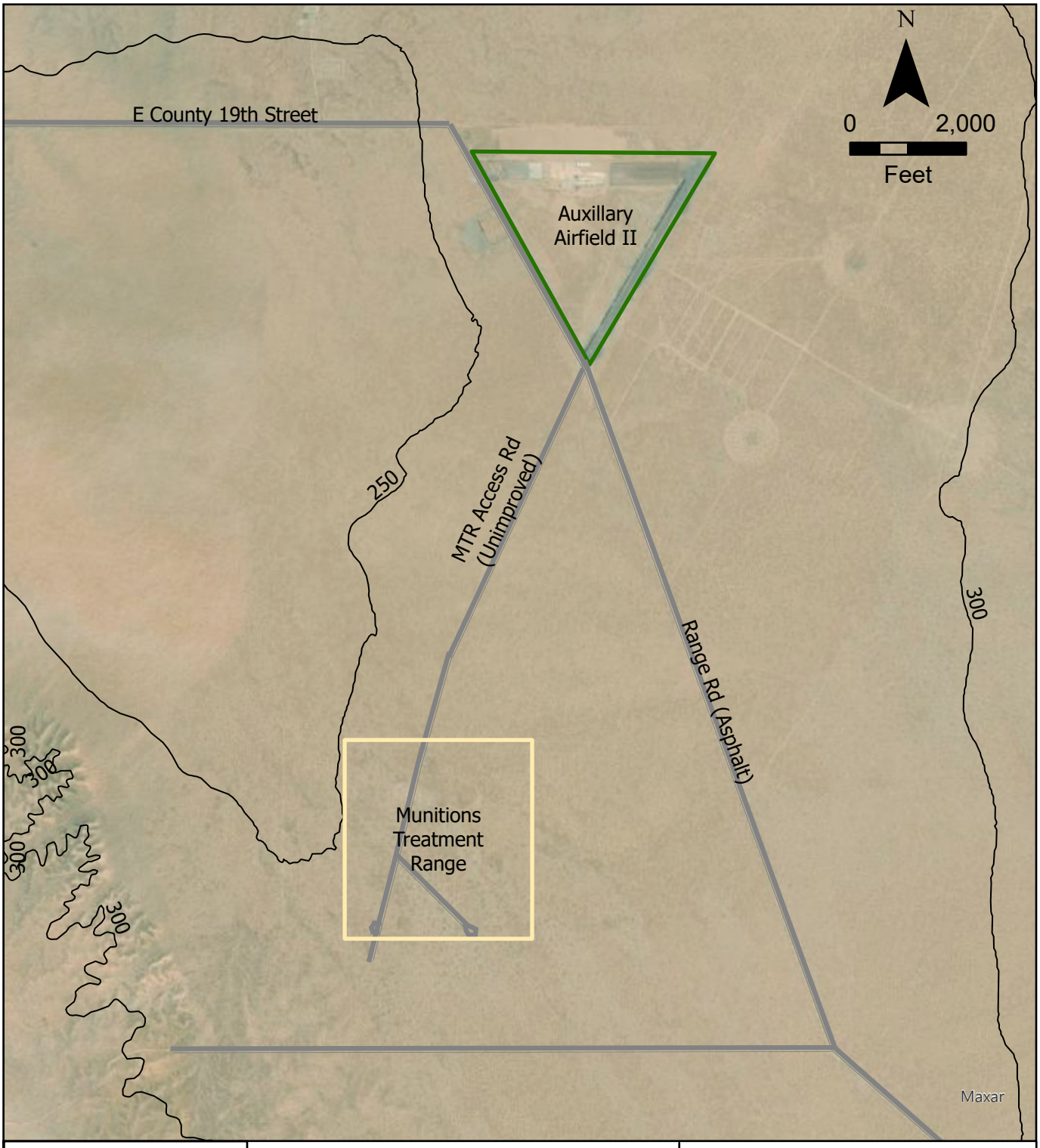
United States Department of Army, 2011. *U.S. Army Corps of Engineers (ACOE) Safety and Health Manual,* EM 385-1-1. July 5.

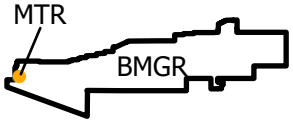
United States Department of Labor Occupational Safety and Health Administration (OSHA), *Title 29 CFR §1910 (General OSHA Standards) and §1926 (Safety and Health Standards for Construction).*

United States Environmental Protection Agency (U.S. EPA), 1992. *Standard Operating Safety Guides*, June.

Site Safety and Health Plan Attachment A

MTR Site Location Map





Munitions Treatment Range

Ground Elevation (feet)

Roads

Auxillary Airfield II

Attachment A
MTR Site Location Map
Barry M. Goldwater Range

Site Safety and Health Plan Attachment B

Activity Hazard Analysis

Activity Hazard Analysis (AHA) #1

Activity/Work Task: General Job Safety	Overall Risk Assessment Code (RAC) (Use highest code)	H
Project Location: MCAS Yuma	**Risk Assessment Code (RAC) Matrix**	
Contract Number: N44255-20-D-5006		
Date Prepared: 2-Jan-25		
Prepared by (Name/Title): Arielle Brooksher		
Reviewed by (Name/Title): Mike Daniel		

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Working at MTR	Explosion From Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Working Outdoors	Solar Radiation Hazard	Wear protective clothing to prevent exposure to the sun.	L
		Use sunscreen and reapply as needed.	
		Use shade to minimize UV exposure and heat stress.	
	Dehydration	Drink at least 1/2 liter of water an hour.	
		Work/rest regimen will be adjusted in accordance with temperature.	
		If possible, strenuous work will be scheduled during the cooler times of the day.	
	Bee, Insect, Vermin, Snakes, and Stings	Advise SSHO if you are allergic to bees or other insects prior to fieldwork.	L
		Do not agitate or disturb insects or other animals.	
		Avoid wearing perfumes, hair spray, or scented lotions.	
		Be aware of potential species locations (culverts, drainage pipes, junk piles, and dense shrubbery).	
		If stung, remove stinger as quickly as possible by raking your fingernail	
		Thoroughly inspect the site area prior to work.	
		Walk or hike in areas where the ground is clear, so you can see where	

		Wear protective clothing such as long heavy pants and high boots.	
		Wear gloves when using your hands to move rocks or brush.	L
		Ledges, cracks or holes are common areas where snakes and insects can be found resting.	
		Report any bites/stings to the SSHO and seek medical attention	
	Slip, Trip, and Fall Hazards	Wear proper footwear at all times.	M
		Use caution when walking on slopes or were moisture is present.	
		Follow good housekeeping procedures in work space.	
		Maintain proper lighting at the site.	
		Remove or clearly mark objects that pose tripping hazards.	
		Walk, do not run while on site.	
		Prevent water accumulation where practicable.	
		Carry objects in a manner that allows you to see in the area you are moving in.	

Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**
Level D PPE	Tailgate Meeting	SSHO Inspections

Activity Hazard Analysis (AHA) #2

Activity/Work Task: Mobilization & Demobilization	Overall Risk Assessment Code (RAC) (Use highest code)		H
Project Location: MCAS Yuma	**Risk Assessment Code (RAC) Matrix**		
Contract Number: N44255-20-D-5006	**Severity**	**Probability**	
Date Prepared: 2-Jan-25		Frequent / Likely / Occasional / Seldom / Unlikely	
Prepared by (Name/Title): Arielle Brooksher	Catastrophic	E / E / H / H / M	
	Critical	E / H / H / M / L	
Reviewed by (Name/Title): Mike Daniel	Marginal	H / M / M / L / L	
	Negligible	M / L / L / L / L	

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Entering MTR/Working at MTR	Explosion From Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Driving to Site	Traffic Accident	Ensure driver has a valid state issued drivers license.	L
		Obey all traffic laws.	
		Secure all items to prevent movement\missile hazards while driving.	
		Do not use cell phones while driving unless equipped as hands-free.	
		Be alert and exercise defensive driving techniques.	
		Adjust driving speed to compensate for poor road and weather conditions.	
	Stress and Fatigue	Drivers should be capable and well rested before driving long distances. Change drivers frequently to prevent fatigue or drowsiness. Take frequent breaks as necessary.	L
		A 12 hour workday is the maximum allowed for any activity of which 10 hours may be spent driving.	
Set up necessary work zones	Back Injury/Strain	Observe proper lifting techniques to lessen the chance of injury.	L
		Ask for help if load is heavy.	
	Traffic Hazard	Wear high-visibility safety vest in traffic areas. Follow all flight line rules and policies. Watch for oncoming traffic. Use a spotter if traffic is heavy.	M
	Chemical Exposure	Plan and demarcate work zones appropriate for the type of contaminants that may be encountered onsite.	L
		If appropriate, use caution tape, cones, or other barriers to differentiate work zones.	
Packing Equipment	Back Injury/Strain	Observe proper lifting techniques lessen the chance of injury. Ask for help if load is heavy.	L

Driving from Site	Traffic Accident	Ensure driver has a valid state issued drivers license.	L
		Secure all items to prevent movement\missile hazards while driving.	
		Obey all traffic laws.	
		Do not use cell phones while driving unless equipped as hands-free.	
		Be alert and exercise defensive driving techniques.	
		Adjust driving speed to compensate for poor road and weather conditions.	
		A 12 hour workday is the maximum allowed for any activity of which 10 hours may be spent driving. Drivers should be capable and well rested before driving long distances. Change drivers frequently to prevent fatigue or drowsiness. Take frequent breaks as necessary.	

Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**
Level D PPE Motorized Vehicles	Tailgate Meeting Valid Driver's License	SSHO Inspections Conduct safety check prior to operation

Activity Hazard Analysis (AHA) #3

Activity/Work Task: DPT Sampling	Overall Risk Assessment Code (RAC) (Use highest code)	H
Project Location: MCAS Yuma		
Contract Number: N44255-20-D-5006		
Date Prepared: 2-Jan-25		
Prepared by (Name/Title): Arielle Brooksher		
Reviewed by (Name/Title): Mike Daniel		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
Working at MTR	Explosion from Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Soil Handling	Struck By	All equipment and tools will be properly secured during transport. All vehicles and equipment will comply with airfield requirements.	M
	Slips, Trips, Falls	Clear obstructions from the excavation area. Practice good housekeeping keeping area clear of obstructions, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. Use caution when walking around the excavation area.	L
	Backing	Use a ground guide along with a functioning back-up alarm during equipment backing.	L
Drilling	Struck By	Utilize appropriate PPE in the exclusion zone. Ensure that ground workers have eye contact with the heavy equipment operator. Ensure that all personnel utilize appropriate hand signals to communicate with the heavy equipment operator.	M
	Chemical Exposure	All personnel will wear personnel protective equipment specified in the SSHP. Personnel and equipment decontamination procedures will be followed.	L
	Electrocution	No overhead or underground electric lines are located in the vicinity of the site.	M
	Pinch and Caught By	All motors must be shut off and electrical, mechanical and hydraulic components locked out of service when making repairs. All personnel shall be trained on kill switch locations.	L
	Fire	All motors must be shut off during refueling.	M
		Fuel containers will not be stored within 10 feet of the equipment. Fuel will be stored in UL approved safety containers with contents clearly labeled.	
		Smoking in the vicinity of the equipment is not permitted.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Level D PPE	Site specific training	SSHO Inspections
Motorized Vehicles	Valid state issue driver's license	Conduct safety check prior to operation.
Hand Tools	Job specific training	Applicable PPE will be inspected in accordance with manufacturer's recommendations.
	Tailgate meeting	Thoroughly inspect tools for corrosion or damage prior to use.

Activity Hazard Analysis (AHA) #4

Activity/Work Task: Soil & Groundwater Sampling	Overall Risk Assessment Code (RAC) (Use highest code)	H
Project Location: MCAS Yuma	**Risk Assessment Code (RAC) Matrix**	
Contract Number: N44255-20-D-5006		
Date Prepared: 2-Jan-25		
Prepared by (Name/Title): Arielle Brooksher		
Reviewed by (Name/Title): Mike Daniel		

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Working at MTR	Explosion from Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Soil and Groundwater Handling	Chemical Exposure- Dermal Contact	All personnel will wear appropriate PPE including chemical resistant gloves (as approriate) and safety goggles or glasses. All personnel will be required to follow appropriate decontamination procedures.	L
	Chemical Exposure- Inhalation	PPE may be upgraded to include respiratory protection at the discretion of the SSHO and SHM.	L
	Slips, Trips, Falls	Clear obstructions from the work area. Practice good housekeeping keeping area clear of obstructions, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. Use caution when walking around the excavation area.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Level D PPE	Site specific training	SSHO Inspections

Site Safety and Health Plan Attachment C

Site Emergency Phone Numbers

SITE EMERGENCY PHONE NUMBERS

Hazards of Concern: VOCs, SVOCs, Metals, Explosives, White Phosphorus, Nitrates/Nitrites, Ammonia, Perchlorate, Hydrocarbons, physical burns, explosions

Minimum Level of Protection: Level D

Emergency resources are listed below.

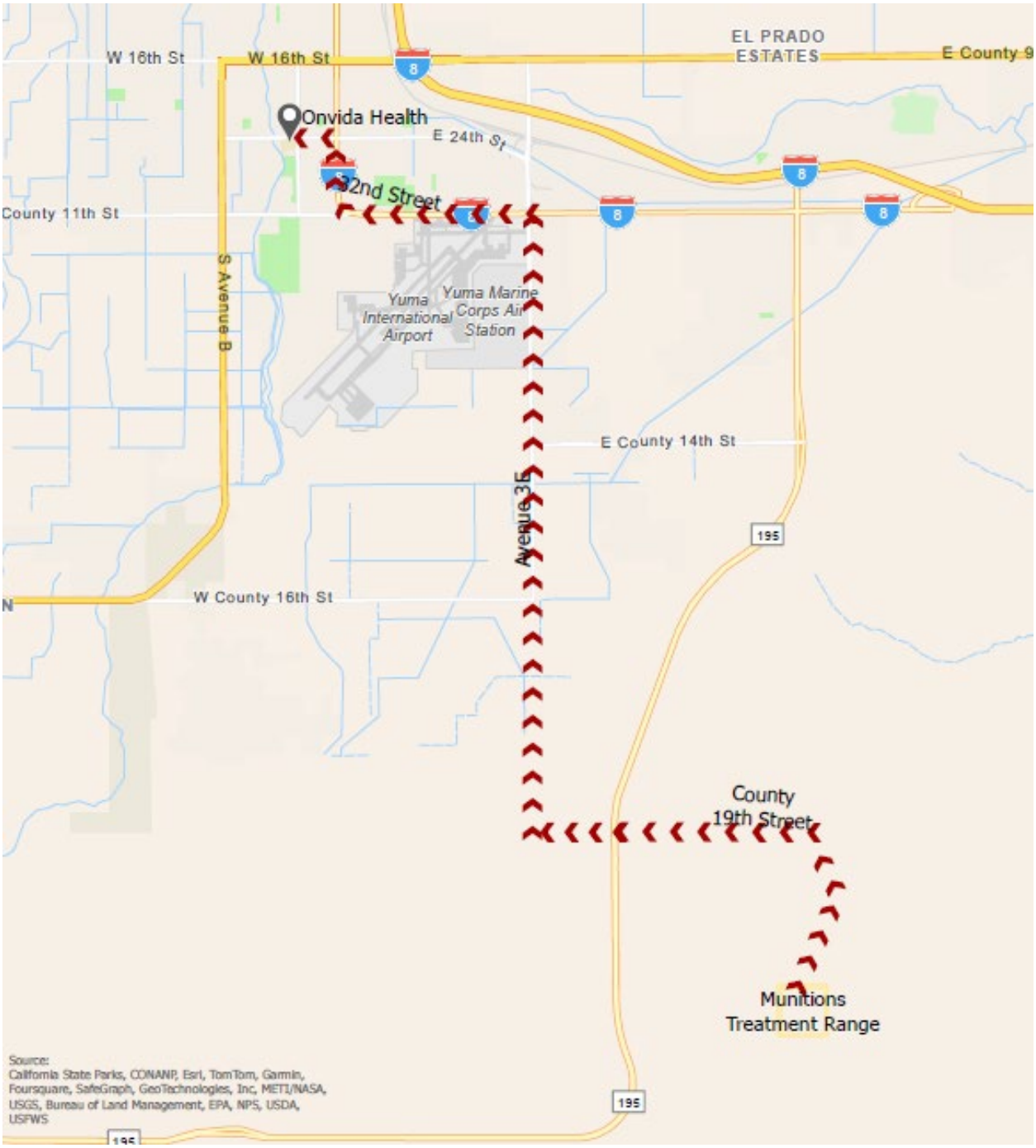
THE MOST RAPID RESPONSE TO AN EMERGENCY SITUATION WILL BE ACHIEVED BY CALLING 928-269-2333. This number is the direct dial contact with MCAS Emergency Responders/Fire Department. A call to 911 will ultimately be routed to the MCAS Fire Department.

Emergency Contact Numbers

Emergency Contact	**Phone Number**
Onvida Health	928-336-2000
Emergency Response (Fire Department)	**928-269-2333** or 911
MCAS Yuma Environmental Director	(928) 269-2282
MCAS Yuma Range Compliance & Inspection Division Director	(928) 269-2936

Site Safety and Health Plan Attachment D

Medical Facility Address and Route Map



Onvida Health
2400 S Avenue A
928.336.2000

Onvida Health is the closest medical facility. Onvida Health is located at 2400 S. Avenue A.

From the Munition Treatment Range, head north east on the MTR access road. Turn Northwest onto bombing range access road via County 19th Street. Continue West on County 19th Street. Turn North via Avenue 3E and continue to 32nd Street. Travel West on 32nd Street through the "big curve" (32nd Street to 4th Avenue transition) and continue to travel North on 4th Avenue to 24th Street. Travel West to Avenue A. Onvida Health Hospital is on the Southwest corner of Avenue A and 24th Street.

Site Safety and Health Plan Attachment E

Safety Field Forms

SITE ENTRY LOG

CTO No. _____ Site No. _____ Site Name _____Date _____

Task or WBS No. _____ Site Location Description _____

HWP No.	Name	Signature	Employer	Employee No.	Time In	Time Out	Exclusion Zone Entry	First Aid Qualified

Reviewed:

_____ _____ _____

Site Safety and Health Officer (Print Name) (Signature) (Date)

TAILGATE SAFETY MEETING DOCUMENTATION

PROJECT TAILGATE SAFETY MEETING SHEET

DATE: _____ **WORK LOCATION:** _____ **WEATHER:** _____

PM (Name): _____ **SHSO (Name):** _____

TASKS TO BE PERFORMED: _____

_____

_____

_____

_____

_____

TASK HAZARDS: _____	**HAZARD MITIGATION:** _____
_____	_____
_____	_____
_____	_____

OTHER POTENTIAL HAZARDS OR CONCERNS: _____

_____

PRE-JOB BRIEFING DATE (primary field crew): _____

REVIEWED PROJECT DOCUMENTS:

- ❑ SCOPE OF WORK
- ❑ PROJECT SPECIFICATIONS
- ❑ SAMPLE AND ANALYSIS PLAN (SAP)
- ❑ QUALITY ASSURANCE PROJECT PLAN (QAPP)
- ❑ HEALTH AND SAFETY PLAN (HASP)
- ❑ OTHER _____

LESSONS LEARNED FROM PREVIOUS ACTIVITIES: _____

_____

_____

TAILGATE SAFETY MEETING ATTENDEES

NAME (PRINTED)	SIGNATURE	COMPANY	DATE

DAILY FIELD REPORT

DATE: _____ PAGE ____ OF _____

JOB NO. _____ FACILITY:_____

SITE: _____

HWP NOS. _____ LOGBOOK NO. _____

RECORDED BY:_____

ADDITIONAL FIELD STAFF/ROLES:

SUBCONTRACTOR: | WEATHER CONDITIONS:

EQUIPMENT	HOURS WORKED	WORK PERFORMED

FIELD ACTIVITIES/COMMENTS:

DATA TRANSMITTED WITH THIS REPORT:

1) COC #'s:

2) Sample Nos. :

3) Health & Safety Issues:

SAFETY & OCCUPATIONAL HEALTH DEFICIENCY TRACKING LOG

Description of the Deficiency	Date Identified	Person responsible for correcting the deficiency	Projected Resolution Date	Date Corrected

(For safety staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS** **ACCIDENT INVESTIGATION REPORT** For use of this form, see Help Menu and USACE Supplement to AR 385-40 The proponent agency is CESO	REQUIREMENT CONTROL SYMBOL: CEEC-S-8 *(R2)*

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ PUBLIC ☐ FATAL ☐ OTHER				☐	

2. PERSONAL DATA

a. NAME *(Last, First MI.)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)* _____

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(YYYYMMDD)*	b. TIME OF ACCIDENT *(Military Time)* hrs.	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME (2) SUBCONTRACTOR

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
_____ ☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)* _____	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)* _____	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)*

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY (CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT (CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY (CODE) #	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	g. TYPE AND SOURCE OF INJURY/ILLNESS
PRIMARY _____ (CODE) #	TYPE _____ (CODE) #
SECONDARY _____ (CODE) #	SOURCE _____ (CODE) #
f. NATURE OF ILLNESS / INJURY (CODE) #	

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT (CODE) #	b. PERSONAL FLOTATION DEVICE USED?
	☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT					
a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT APPLICABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE ☐☐ TRUCK ☐☐ OTHER *(Specify)* _____	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)* _____	(1) FRONT SEAT	☐	☐	☐
		(2) REAR SEAT	☐	☐	☐

8. PROPERTY MATERIAL INVOLVED		
a. NAME OF ITEM	b. OWNERSHIP	c. AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE)	a. ACTIVITY AT TIME OF ACCIDENT	(CODE)
_____	# ☐	_____	# ☐

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary, see attached page 4.)*

11. CAUSAL FACTOR*(s) (Read instructions before completing)*

a. *(Explain YES answers in item 13)*	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident?	☐	☐
b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT? *(If yes, attach a copy.)*	☐	☐

12. TRAINING		
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING	c. DATE OF MOST RECENT FORMAL TRAINING *(YYYYMMDD)*
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE*(s) (Attach additional sheets as needed, See page 4)*

b. INDIRECT CAUSE*(s) (Attach additional sheets as needed, See page 5)*

14.	ACTION*(s)* TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE*(s)*	
DESCRIBE FULLY *(Attach additional sheets as necessary, See page 5)*		
15.	DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.	
a. BEGINNING *(YYYYMMDD)*	b. ANTICIPATED COMPLETION *(YYYYMMDD)*	
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CORPS SIGNATURE, SUPERVISOR COMPLETING REPORT
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CONTRACTOR SIGNATURE, SUPERVISOR COMPLETING REPORT
f. ORGANIZATION IDENTIFIER *(Division, Branch, Section, etc.,)*		g. OFFICE SYMBOL
16.	MANAGEMENT REVIEW *(1st)*	
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
17.	MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.,)*	
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
18.	SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW	
a. ☐ CONCUR b. ☐ NONCONCUR c. ADDITIONAL ACTIONS/COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
19.	COMMAND APPROVAL	
COMMENTS		
DATE *(YYYYMMDD)*	COMMANDER SIGNATURE	

10. ACCIDENT DESCRIPTION *(Continuation)*

13a. DIRECT CAUSE*(s) (Continuation)*

13b. INDIRECT CAUSE*(s) (Continuation)*

14. ACTION*(s)* TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE*(s) (Continuation)*

GENERAL. Complete a separate report for each person who was injured, caused, or contributed to the accident *(excluding uninjured personnel and witnesses)*. Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs *(OWCP)* shall be at the discretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1 - ACCIDENT CLASSIFICATION

(Mark All Boxes That Are Applicable)

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 *(injury)*, CA-2 *(illness)* or CA-6 *(fatality)* to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to government property *(including motor vehicles)*.

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any contractor lost-time injury/illness or fatality.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property *(including motor vehicles).*

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in public fatality or permanent total disability. *(The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander)*.

(2) VOID SPACE - Make no entry.

(3) VEHICLE INVOLVED - Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" is marked.

(4) VOID SPACE - Make no entry.

INSTRUCTIONS FOR SECTION 2 - PERSONAL DATA

a. NAME - *(MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS)*. Enter last name, first name, middle initial of person involved.

b. AGE - Enter age.

c. SEX - Mark appropriate box.

d. SOCIAL SECURITY NUMBER - *(FOR GOVERNMENT PERSONNEL ONLY*) Enter the social security number *(or other personal identification number if no social security number issued).*

e. GRADE - *(FOR GOVERNMENT PERSONNEL ONLY)* Enter pay grade. Example: 0-6; E-7; WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE - For government civilian employees enter the pay plan, full series number, and job title, e.g., GS-O810/Civil Engineer. For military personnel enter the primary military occupational specialty *(PMOS)*, e.g., 15A30 or 11G50. For contractor employees enter the job title assigned to the injured person, e.g., carpenter, laborer, surveyor, etc.

g. DUTY STATUS - Mark the appropriate box.

(1) ON DUTY - Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.

(2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.

(3) OFF DUTY - Person was not on official business at time of accident.

h. EMPLOYMENT STATUS - *(FOR GOVERNMENT PERSONNEL ONLY)* Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3 - GENERAL INFORMATION

a. DATE OF ACCIDENT - Enter the month, day, and year of accident.

b. TIME OF ACCIDENT - Enter the local time of accident in military time. Example: 1430 hrs *(not 2:30 p.m.)*.

c. EXACT LOCATION OF ACCIDENT - Enter facts needed to locate the accident scene, *(installation/project name, building number, street, direction and distance from closest landmark, etc.)*.

d. CONTRACTOR NAME

(1) PRIME - Enter the exact name *(title of firm)* of the prime contractor.

(2) SUBCONTRACTOR - Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER - Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.

f. TYPE OF CONTRACT - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY *(HTW)* - Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program *(IRP)* HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site *(FUDS)* activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 - CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY - Select the most appropriate construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION
2. SITE PREPARATION
3. EXCAVATION/TRENCHING
4. GRADING (EARTHWORK)
5. PIPING/UTILITIES
6. FOUNDATION
7. FORMING
8. CONCRETE PLACEMENT
9. STEEL ERECTION
10. ROOFING
11. FRAMING
12. MASONRY
13. CARPENTRY
14. ELECTRICAL
15. SCAFFOLDING/ACCESS
16. MECHANICAL
17. PAINTING
18. EOUIPMENT/MAINTENANCE
19. TUNNELING
20. WAREHOUSING/STORAGE
21. PAVING
22. FENCING
23. SIGNING
24. LANDSCAPING/IRRIGATION
25. INSULATION
26. DEMOLITION

b. TYPE OF CONSTRUCTION EQUIPMENT - Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER
2. DRAGLINE
3. CRANE *(ON VESSEL/BARGE)*
4. CRANE *(TRACKED)*
5. CRANE *(RUBBER TIRE)*
6. CRANE *(VEHICLE MOUNTED)*
7. CRANE *(TOWER)*
8. SHOVEL
9. SCRAPER
10. PUMP TRUCK *(CONCRETE)*
11. TRUCK *(CONCRETE/TRANSIT MIXER)*
12. DUMP TRUCK *(HIGHWAY)*
13. DUMP TRUCK *(OFF HIGHWAY)*
14. TRUCK *(OTHER)*
15. FORKLIFT
16. BACKHOE
17. FRONT-END LOADER
18. PILE DRIVER
19. TRACTOR *(UTILITY)*
20. MANLIFT
21. DOZER
22. DRILL RIG
23. COMPACTOR/VIBRATORY ROLLER
24. OTHER

INSTRUCTIONS FOR SECTION 5 - INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY/ILLNESS - Reference paragraph 2-10 of USACE Supplement 1 to AR 385-40 and enter code and description from list below.

NOI	NO INJURY
FAT	FATALITY
PTL	PERMANENT TOTAL DISABILITY
PPR	PERMANENT PARTIAL DISABILITY
LWD	LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK
NLW	RECORDABLE CASE WITHOUT LOST WORKDAYS
RFA	RECORDABLE FIRST AID CASE
NRI	NON-RECORDABLE INJURY

b. ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED - Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER
HEAD, EXTERNAL	H1	EYE EXTERNAL
	H2	BOTH EYES EXTERNAL
	H3	EAR EXTERNAL
	H4	BOTH EARS EXTERNAL
	HC	CHIN
	HF	FACE
	HK	NECK/THROAT
	HM	MOUTH/LIPS
	HN	NOSE
	HS	SCALP
KNEE	KB	BOTH KNEES
	KS	KNEE
LEG, HIP, ANKLE, BUTTOCKS	LB	BOTH LEGS/HIPS/ ANKLES/
BUTTOCK	LS	SINGLE LEG/HIP/ ANKLE/BUTTOCK
HAND	MB	BOTH HANDS
	MS	SINGLE HAND
FOOT	PB	BOTH FEET
	PS	SINGLE FOOT
TRUNK, BONES	R1	SINGLE COLLAR BONE
	R2	BOTH COLLAR BONES
	R3	SHOULDER BLADE
	R4	BOTH SHOULDER BLADES
	RB	RIB
	RS	STERNUM *(BREAST BONE)*
	RV	VERTEBRAE *(SPINE; DISC)*
	RZ	TRUNK BONES OTHER
SHOULDER	SB	BOTH SHOULDERS
	SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS
	TS	SINGLE THUMB
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE
	V2	LUNGS, BOTH
	V3	KIDNEY, SINGLE
	V4	KIDNEYS, BOTH
	VH	HEART
	VL	LIVER
	VR	REPRODUCTIVE ORGANS
	VS	STOMACH
	VV	INTESTINES
	VZ	TRUNK, INTERNAL; OTHER

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury/illness from the list below. This nature of injury/illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury/illness name on the line and place the corresponding CODE letters in the box provided.
* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/INFECTIVE/ PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER, STRESS; NERVOUS CONDITION
	T8	TRAUMATIC INJURY - OTHER *(EXCEPT DISEASE, ILLNESS)*

** A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME			
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY					
RESPIRATORY DISEASE	RA	ASBESTOSIS		DD	ENDEMIC DISEASE *(OTHER THAN CODE TYPES R&S)*
	RB	BRONCHITIS			
	RE	EMPHYSEMA		DE	EFFECT OF ENVIRONMENTAL
	RP	PNEUMOCONIOSIS	CONDITION		
	RS	SILICOSIS		DH	HEARING LOSS
	R9	RESPIRATORY DISEASE, OTHER		DK	HEART CONDITION
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES				DM	MENTAL DISORDER, EMOTIONAL STRESS, NERVOUS CONDITION
	VB	BRUCELLOSIS		DR	RADIATION
	VC	COCCIDIOMYCOSIS		DS	STRAIN, MULTIPLE
	VF	FOOD POISONING		DU	ULCER
	VH	HEPATITIS		DV	OTHER VASCULAR CONDITIONS
	VM	MALARIA		D9	DISABILITY, OTHER
	VS	STAPHYLOCOCCUS			
	VT	TUBERCULOSIS	SKIN DISEASE OR		
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC - OTHER	CONDITION	SB	BIOLOGICAL
DISABILITY, OCCUPATIONAL	DA	ARTHRITIS, BURSITIS		SC	CHEMICAL
	DB	BACK STRAIN, BACK SPRAIN		S9	DERMATITIS, UNCLASSIFIED
	DC	CEREBRAL VASCULAR CONDITION; STROKE			

g. TYPE AND SOURCE OF INJURY/ILLNESS *(CAUSE)* - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident *(see example 1, below)*. Examples:

(1) An employee tripped on carpet and struck his head on a desk. TYPE: 210 *(fell on same level)* SOURCE: 0110 *(walking/working surface*).

NOTE: This example would NOT be coded 120 *(struck against)* and 0140 *(furniture)*.

(2) A Park Ranger contracted dermatitis from contact with poison ivy/oak.

TYPE: 510 *(contact)* SOURCE: 0920 *(plant)*

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.

TYPE: 410 *(punctured by)* SOURCE: 0830 *(metal)*

(4) An employee was driving a government vehicle when it was struck by another vehicle.

TYPE: 800 *(traveling in)* SOURCE: 0421 *(government-owned vehicle, as driver)*

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME		
			EXERTED
		0610	LIFTED, STRAINED BY *(SINGLE ACTION)*
	STRUCK	0620	STRESSED BY *(REPEATED ACTION)*
0110	STRUCK BY		EXPOSED
0111	STRUCK BY FALLING OBJECT	0710	INHALED
0120	STRUCK AGAINST	0720	INGESTED
	FELL, SLIPPED, TRIPPED	0730	ABSORBED
0210	FELL ON SAME LEVEL	0740	EXPOSED TO
0220	FELL ON DIFFERENT LEVEL	0800	TRAVELING IN
0230	SLIPPED, TRIPPED *(NO FALL)*		
	CAUGHT	**CODE**	**SOURCE OF INJURY NAME**
0310	CAUGHT ON		
0320	CAUGHT IN	0100	BUILDING OR WORKING AREA
0330	CAUGHT BETWEEN	0110	WALKING/WORKING SURFACE *(FLOOR, STREET, SIDEWALKS, ETC.)*
	PUNCTURED, LACERATED		
0410	PUNCTURED BY	0120	STAIRS, STEPS
0420	CUT BY	0130	LADDER
0430	STUNG BY	0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0440	BITTEN BY	0150	BOILER, PRESSURE VESSEL
	CONTACTED	0160	EQUIPMENT LAYOUT *(ERGONOMIC)*
0510	CONTACTED WITH *(INJURED PERSON MOVING)*	0170	WINDOWS, DOORS
0520	CONTACTED BY *(OBJECT WAS MOVING)*	0180	ELECTRICITY

0200	ENVIRONMENTAL CONDITION	0631	CARBON MONOXIDE
0210	TEMPERATURE EXTREME *(INDOOR)*	0640	MIST, STEAM, VAPOR, FUME
0220	WEATHER *(ICE, RAIN, HEAT, ETC.)*	0641	WELDING FUMES
0230	FIRE, FLAME, SMOKE *(NOT TOBACCO)*	0650	PARTICLES *(UNIDENTIFIED)*
0240	NOISE	0700	CHEMICAL, PLASTIC, ETC.
0250	RADIATION	0711	DRY CHEMICAL - CORROSIVE
0260	LIGHT	0712	DRY CHEMICAL - TOXIC
0270	VENTILATION	0713	DRY CHEMICAL - EXPLOSIVE
0271	TOBACCO SMOKE	0714	DRY CHEMICAL FLAMMABLE
0280	STRESS *(EMOTIONAL)*	0721	LIQUID CHEMICAL - CORROSIVE
0290	CONFINED SPACE	0722	LIQUID CHEMICAL - TOXIC
0300	MACHINE OR TOOL	0723	LIQUID CHEMICAL - EXPLOSIVE
0310	HAND TOOL *(POWERED; SAW, GRINDER, ETC.)*	0724	LIQUID CHEMICAL - FLAMMABLE
0320	HAND TOOL *(NONPOWERED)*	0730	PLASTIC
0330	MECHANICAL POWER TRANSMISSION APPARATUS	0740	WATER
0340	GUARD, SHIELD *(FIXED, MOVEABLE, INTERLOCK)*	0750	MEDICINE
0350	VIDEO DISPLAY TERMINAL	0800	INAMINATE OBJECT
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL	0810	BOX, BARREL, ETC.
0370	HEATING EQUIPMENT	0820	PAPER
0380	WELDING EQUIPMENT	0830	METAL ITEM, MINERAL
0400	VEHICLE	0831	NEEDLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE	0840	GLASS
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE	0850	SCRAP, TRASH
0421	DRIVER OF GOVERNMENT VEHICLE	0860	WOOD
0422	PASSENGER OF GOVERNMENT VEHICLE	0870	FOOD
0430	COMMON CARRIER *(AIRLINE, BUS, ETC.)*	0880	CLOTHING, APPAREL, SHOES
0440	AIRCRAFT *(NOT COMMERCIAL)*	0900	ANIMATE OBJECT
0450	BOAT, SHIP, BARGE	0911	DOG
0500	MATERIAL HANDLING EQUIPMENT	0912	OTHER ANIMAL
0510	EARTHMOVER *(TRACTOR, BACKHOE, ETC.)*	0920	PLANT
0520	CONVEYOR *(FOR MATERIAL AND EQUIPMENT)*	0930	INSECT
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST	0940	HUMAN *(VIOLENCE)*
0540	HOIST, SLING CHAIN, JACK	0950	HUMAN *(COMMUNICABLE DISEASE)*
0550	CRANE	0960	BACTERIA, VIRUS *(NOT HUMAN CONTACT)*
0551	FORKLIFT	1000	PERSONAL PROTECTIVE EQUIPMENT
0560	HANDTRUCK, DOLLY	1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
0600	DUST, VAPOR, ETC.		
0610	DUST *(SILICA, COAL, ETC.)*	1020	RESPIRATOR, MASK
0620	FIBERS	1021	DIVING EQUIPMENT
0621	ASBESTOS	1030	SAFETY BELT, HARNESS
0630	GASES	1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 - PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT - Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the most appropriate primary activity area *(water related, non-water related or other activity)*, the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating-powered
3. Boating-unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities *(skin diving, scuba, etc.)*
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing *(general)*
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer *(baseball, football, etc.)*
24. Sports/winter *(skiing, sledding, snowmobiling etc.)*
25. Cycling *(bicycle, motorcycle, scooter)*
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts *(fights, riots, vandalism, etc.)*
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED - If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7 - MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE - Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION - Mark appropriate box.

c. SEAT BELT - Mark appropriate box.

INSTRUCTIONS FOR SECTION 8 - PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM - Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number *(NSN)* whenever applicable.

b. OWNERSHIP - Enter ownership for each item listed. *(Enter one of the following: USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE)*

c. $ AMOUNT OF DAMAGE - Enter the total estimated dollar amount of damage *(parts and labor)*, if any.

INSTRUCTIONS FOR SECTION 9 - VESSEL/FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT - Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel floating plant.

VESSEL/FLOATING PLANTS

1. ROW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL, BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP - Select from the list below the object*(s)* that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN 0N DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10 - ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT - Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role*(s)* in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11 - CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE - Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION - Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES - Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES - Were any of the provisions of the Safety and Health Requirements Manual *(EM 385-1-1)* violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice *(including EM 385-1-1)* fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS - Was the person under undue stress *(either internal or external to the job)*? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS - Did exposure to chemical agents *(either single shift exposure or long-term exposure)* such as dusts, fibers *(asbestos, etc.)*, silica, gases *(carbon monoxide, chlorine, etc.,)*, mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation *(UV radiation created during welding, etc.)* contribute to the accident/incident?

(9**)** OFFICE FACTORS **-** Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) SUPPORT FACTORS - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources *(in terms of employee skills, number of workers, and adequate supervision)* available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?

(11) PERSONAL PROTECTIVE EQUIPMENT - Did the person fail to use appropriate personal protective equipment *(gloves, eye protection, hard-toed shoes, respirator, etc.)* for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard*(s)*? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) DRUGS/ALCOHOL - Is there any reason to believe the person's mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS - Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. If one was performed, attach a copy of the analysis to the report.

INSTRUCTIONS FOR SECTION 12 - TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? - For the purpose of this section "trained" means the person has been provided the necessary information *(either formal and/or on-the-job (OJT) training)* to competently perform the activity/task in a safe and healthful manner.

b. TYPE OF TRAINING - Mark the appropriate box that best indicates the type of training; *(classroom or on-the-job)* that the injured person received, before the accident happened.

c. DATE OF MOST RECENT TRAINING - Enter YYYYMMDD of the last formal training completed that covered the activity task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13 - CAUSES

a. DIRECT CAUSES - The direct cause is that single factor, which most directly lead to the accident. See examples below.

b. INDIRECT CAUSES - **I**ndirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.

Direct cause: failure to provide fall protection at elevation. Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee *(possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety)*; failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. *(Note: USACE vehicle was in proper/safe working condition).*

Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.

Indirect cause: failure of employee to pay attention to driving *(defensive driving)*.

INSTRUCTIONS FOR SECTION 14 - ACTION TO ELIMINATE CAUSE*(s)*

DESCRIPTION - Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/ illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15 - DATES FOR ACTION

a. **BEGIN DATE** - Enter the date YYYYMMDD when the corrective action(s) identified in section 14 will begin.

b. **COMPLETE DATE** - Enter the date YYYYMMDD when the corrective action(s) identified in section 14 will be completed.

c. **DATE SIGNED** - Enter YYYYMMDD that the report was signed by the responsible supervisor.

d.e.. **TITLE AND SIGNATURE -** Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE supervisor shall also sign the report. Upon entering the information required in 15c., 15d., 15e., 15f. and 15g. below, the responsible USACE supervisor shall forward the report for management review as indicated in section 16.

f. **ORGANIZATION NAME** - For GOVERNMENT employee accidents enter the USACE organization name *(Division, Branch, Section, etc.)* of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15d. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

g. **OFFICE SYMBOL** - Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15f.

INSTRUCTIONS FOR SECTION 16 - MANAGEMENT REVIEW (1st)

1ST REVIEW - Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15d. shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief *(2nd review)* for review and comment.

INSTRUCTIONS FOR SECTION 17 - MANAGEMENT REVIEW (2nd)

2ND REVIEW - The FOA Staff Chief *(i .e., FOA Chief of Construction, Operations, Engineering, Planning, etc.)* shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18 - SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW - The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19 - COMMAND APPROVAL

4TH REVIEW - The FOA Commander shall *(to include the person designated Acting Commander in his absence)* review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

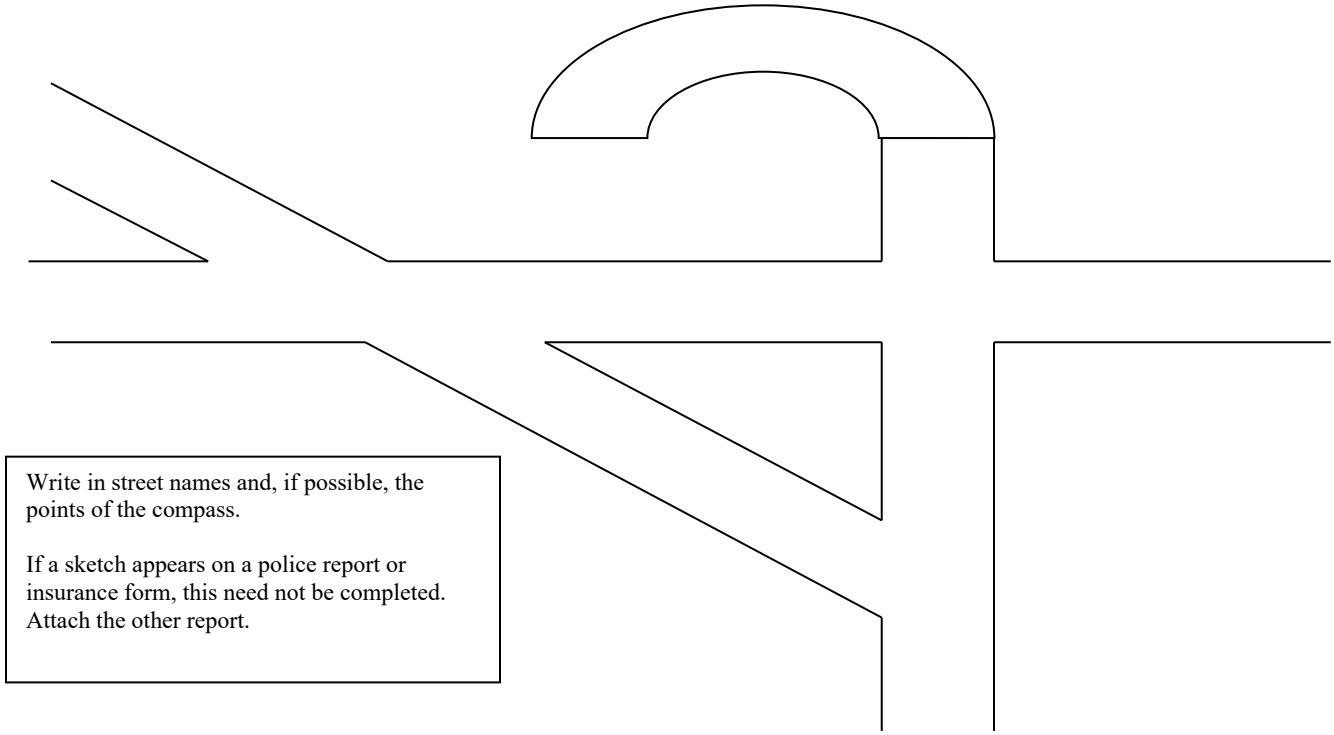
INCIDENT/ACCIDENT INVESTIGATION REPORT

TYPE OF INCIDENT - CHECK ALL THAT APPLY					
☐ INJURY/ILLNESS	☐ VEHICLE ACCIDENT	☐ FIRE/EXPLOSION			
☐ SPILL/RELEASE	☐ PERMIT EXCEEDANCE	☐ NONCOMPLIANCE			
☐ NEAR MISS					
Project/Office:		Project Number:			
Date of Incident:		Time of Incident:			
Location of Incident:					
Supervisor on Duty:		At Scene of Incident: ☐ YES ☐ NO			
Description:					

Event Sketch

INCIDENT/ACCIDENT INVESTIGATION REPORT

Vehicle Events



Write in street names and, if possible, the points of the compass.

If a sketch appears on a police report or insurance form, this need not be completed. Attach the other report.

Did Injury/Illness Result? ☐ Yes ☐ No	If Yes: Employee Name:				
Job Position:		Time In This Position:		Time w/company:	
List All PPE In Use:					
Was Medical Treatment Provided? ☐ Onsite ☐ Dr.'s Office ☐ Hospital					
Name of Person Providing Treatment:					
Address Where Treatment Was Provided:					
Type of Treatment:					
Was Property Damaged? ☐ Yes ☐ No					
Did Contamination Result? ☐ Yes ☐ No					
Describe:					
Names of Witnesses/Coworkers:					
Weather / Environmental Conditions:					
Main Cause(s):					
Indirect Cause/Contributing Factors:					
Was an AHA developed for the task being performed?		☐ Yes ☐ No		If yes, attach a copy.	

INCIDENT/ACCIDENT INVESTIGATION REPORT

NOTIFICATIONS					
Names of SES Personnel Notified:					
Names:		Date:		Time:	
Names:		Date:		Time:	
Names:		Date:		Time:	
Client Notified:					
Names:		Date:		Time:	
Names:		Date:		Time:	
Names:		Date:		Time:	

CORRECTIVE ACTION
What Corrective Actions Were Taken?
What preventative actions have been taken or will be implemented to prevent occurrence or recurrence? (List the Person(s) responsible for implementation and target completion date for each item, initial when completed)

Action No.	Preventative Action	Responsible Person	Target Date	Completed Date	Initials

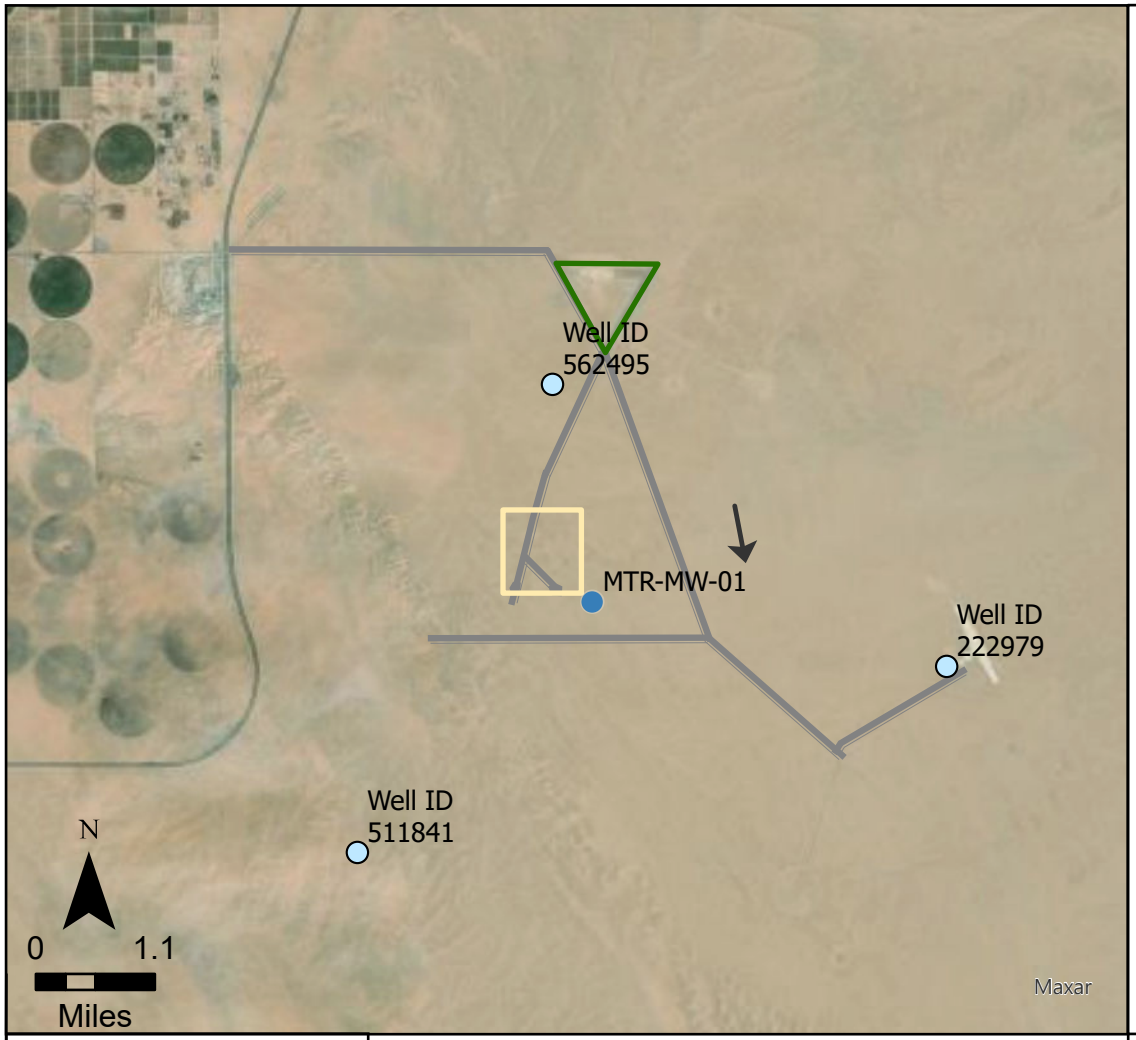
Was incident reported in client's incident reporting system (if applicable)?	☐ Yes ☐ No
SHM Manager's determination of incident severity:	☐ Major Incident ☐ Minor Incident

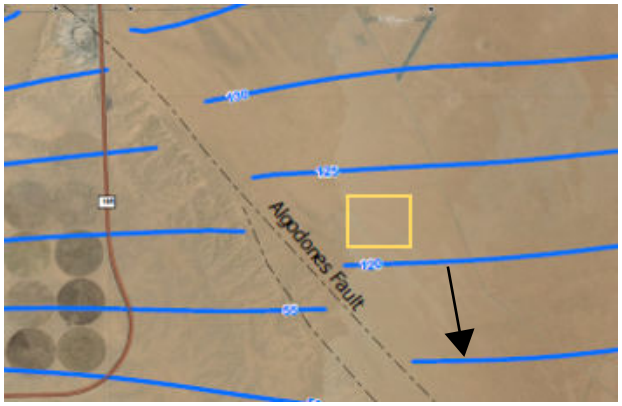
INVESTIGATION TEAM MEMBERS				
Involved:	Name		Name	
	Name		Name	
Others:	Name		Name	
	Name		Name	
Project Manager:	Name			
SHM Manager:	Name		Signature	
Client representative(s) contacted:				

Distribution: Ensure the completed report is legible and forward to the SHM Manager.

Exhibit D-4

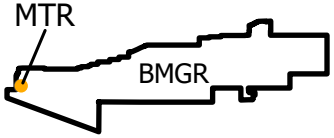
Well Location Map





Source:
Bureau of Reclamation
Yuma Area Groundwater Map June 2022

Distance from MTR Boundary to Production Wells:
Well ID 562495 1.16 mi
Well ID 511841 2.76 mi
Well ID 222979 3.45 mi

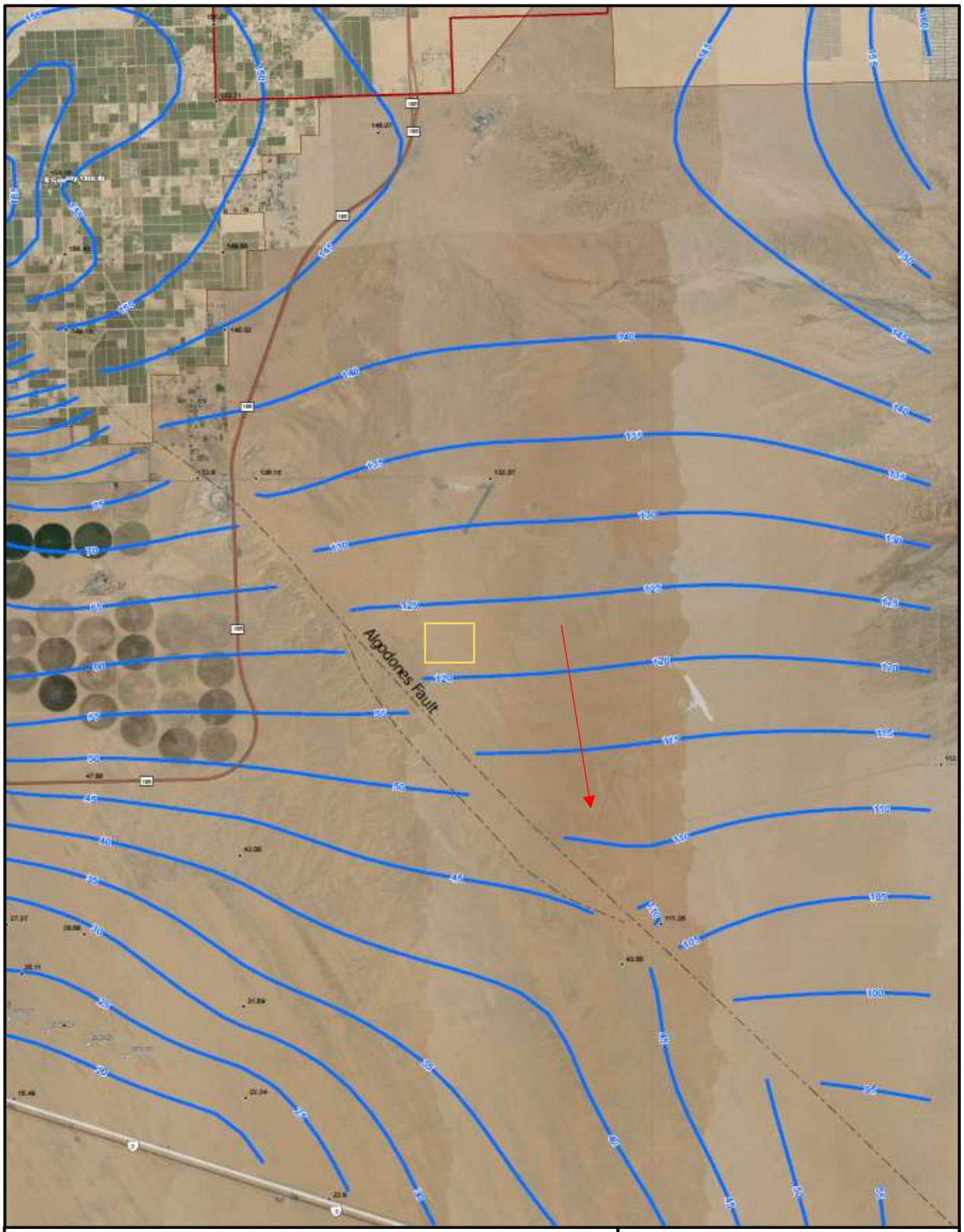


- Groundwater Flow
- Roads
- Auxillary Airfield II
- Munitions Treatment Range
- Existing MTR Well Location
- Groundwater Elevation (feet)
- Production Well

Exhibit D-4
Well Location Map
Munitions Treatment Range
Barry M. Goldwater Range

Exhibit D-5

Regional Groundwater Elevation Map



Groundwater Elevation Contour

Groundwater Flow Direction

MTR Location

Exhibit D-5
Regional Groundwater Elevation Map
Barry M. Goldwater Range

Source:
Bureau of Reclamation
Yuma Area Groundwater Map June 2022

Exhibit D-6

Well Construction Diagram

Nicklaus Engineering, Inc.
1851 W. 24th St.
Yuma, Arizona 85364
Telephone: 928-344-8374
Fax: 928-726-6994

BORING NUMBER MTR-MW-01

CLIENT MCAS Yuma
PROJECT NAME MTR
PROJECT NUMBER 10GC007
PROJECT LOCATION
DATE STARTED 2/21/14 **COMPLETED** 2/26/14
GROUND ELEVATION 264 ft **HOLE SIZE** 9 inches
DRILLING CONTRACTOR Geomechanics Southwest
GROUND WATER LEVELS:
DRILLING METHOD Mud Rotary / Air Percussion / Odex Tubing
AT TIME OF DRILLING ---
LOGGED BY GCE **CHECKED BY** Stacy Gutierrez
AT END OF DRILLING 142.00 ft / Elev 122.00 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SILTY SAND, (SM)
10	SPT 1	12-30-47 (77)	PID = 0		SILTY SAND WITH GRAVEL, (SM)
20	SPT 2	50	PID = 0		SILTY GRAVEL WITH SAND, (SM)
30	SPT 3	41-50	PID = 0		SILTY SAND WITH GRAVEL, (SM)
40	SPT 4	50	PID = 0		SILTY SAND WITH GRAVEL, (SM)
50	SPT 5	50			SILTY SAND, (SM)
60	SPT 6	50	PID = 0		SILTY SAND, (SM)
70	SPT 7	50			SILTY SAND, (SM)
80	SPT 8	50	PID = 0		SILTY GRAVEL WITH SAND, (SM)
90	SPT 9	50	PID = 0		SILTY SAND, (SM)
100	SPT 10	50	PID = 0		SILTY SAND, (SM)
110	SPT 11	50	PID = 0		SILTY SAND, (SM)
120	SPT 12	50	PID = 0		SILTY SAND WITH GRAVEL, (SM)
	SPT 13	50	PID = 0		SILTY SAND WITH GRAVEL, (SM)
130					
140	SPT 14	50	PID = 0		SILTY SAND WITH GRAVEL, (SM)
					SILTY SAND, (SM)
150					SILTY SAND, (SM)
160					

WELL DIAGRAM

Casing Type: PVC Casing

- Grout Seal (0 - 110 ft)
- PVC Casing (0 - 135 ft)
- Bentonite Seal (110 - 165 ft)
- Filter Pack (115 - 165 ft)
- Screen (135 - 165 ft)

Bottom of borehole at 165.0 feet.

EXHIBIT D-6 - WELL CONSTRUCTION DIAGRAM

ATTACHMENT E
PROCEDURES TO PREVENT HAZARDS

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E.1 Security Procedures and Equipment....1

E.2 General Inspection Requirements....2

E.3 Preparedness and Prevention....3

E.4 General Hazard Protection....4

E.5 Prevention of Accidental Ignition or Reaction of Wastes....5

List of Exhibits

Exhibit E-1 MTR Inspection Checklist
Exhibit E-2 MTR Signage

ATTACHMENT E
Procedures to Prevent Hazards

The information provided in this section is submitted in accordance with the requirements of 40 CFR 270.14(b)(4), (5), (6), (8), and (9); 264.14; 264.15; 264.17; and 264, Subpart C. This section addresses security procedures, preparedness and prevention requirements, general hazard prevention, and prevention of accidental ignition or reaction of ignitable, reactive, or incompatible wastes.

E.1 Security Procedures and Equipment

The MTR is completely surrounded by a three-strand barbed wire fence and 5-foot tall coils of razor wire. Gates on the north and south sides of the MTR and one-mile north and south of MTR on the MTR access road are all locked.

The BMGR is not completely surrounded by fencing, but segments of fence have been installed at certain recognized entry points to warn of impending entry to a controlled location. Natural barriers of mountains and inhospitable desert also serve to control entry to the BMGR. Only selected sections of the BMGR are accessible to the public. Public (e.g., hunters) access to areas of the range that are inactive is granted after obtaining a "hold harmless" agreement from MCAS Yuma's Range Management Office. However, not all sections of the BMGR are accessible to the public. Warning signs are legible from 25 feet and are posted at all BMGR gates, on the range boundary south of Interstate 8, and on the fence surrounding the MTR. Existing warning signs include the following language in English, "Danger Explosive Disposal Range Keep Out" and in Spanish "Peligro Area De Disposicion De Explosivos No Entre". A picture of the signage is included as Exhibit E-2.

The MCAS Yuma EOD division does not maintain permanent stations on the BMGR. Personnel travel from the MCAS Yuma Main Base to perform scheduled operations. During treatment operations there is controlled entry into MTR. At the end of these operations, MCAS Yuma EOD personnel return to MCAS Yuma Main Base. Access to the MTR is not controlled when MCAS Yuma EOD personnel are not present. However, since no explosive ordnance is stored onsite and any potentially hazardous residues generated during the treatment process are collected and subsequently treated, on-site security between operations is not a significant concern.

The OD units have scheduled operations, and with respect to timing of these operations, security procedures are strictly followed. The waste is detonated almost immediately after it is brought to the site; therefore, there are no security requirements for storage of reactive waste prior to disposal. Hazardous waste in route to the MTR are subject to 49 CFR 172 Subpart I, Security Plan Requirements.

The MCAS Yuma EOD SOP (Permit Attachment A, Exhibit A-1) requires that for every non-emergency operation (including training), at least two EOD personnel must be present: an OIC and a Range Safety Officer (RSO). In addition, qualified medical personnel must also be present during OD operations.

Range Management at MCAS Yuma is notified upon arrival of the MCAS Yuma EOD personnel at the MTR and before any explosive initiation. Radio contact with Range Management is maintained throughout the operation. A first aid kit and qualified medical personnel are onsite during all treatment operations. Procedures for the evacuation of injured personnel during emergency situations are included in Section 5.5 of the MCAS Yuma EOD SOP (Attachment A, Exhibit A-1).

E.2 General Inspection Requirements

The MTR is regularly inspected to ensure that no unauthorized personnel have trespassed within MTR boundaries, check the condition of all warning signs, boundary fences and gates, maintain the overall readiness of the MTR, ensure the MTR's preparedness in the event of emergency, and check the condition of access and periphery roads. Documentation of each inspection is recorded in the MTR Inspection Checklist (Exhibit E-1). Security devices, including fences, signs, gates, range areas, including main and perimeter roads, gate area, flag poles, and periphery are inspected weekly by MCAS Yuma Environmental. Communications equipment (radios and cellular/satellite phones) and safety and emergency equipment, such as fire extinguishers, and first aid equipment are inspected before and after each use and annually by MCAS Yuma EOD. Given the limited utilization of the MTR, inspections will presently be conducted on an annual basis by EOD. Should the frequency of use increase to two or more events within a calendar year, the inspection schedule will be revised to correspond with the number of events held at the MTR. After each inspection, the completed MTR Inspection Checklists are filed in the operating records maintained by the responsible department, either MCAS Yuma Environmental or MCAS Yuma EOD. Inspection records are to be kept for at least three years from the date of the inspection, at a minimum, each inspection record must include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions [40 CFR 264.15(d)].

Another inspection item is to verify that vegetation has not encroached on these locations. Since this area is comprised of sand dunes, the re-vegetation potential is minimal.

Vehicles used to transport demolition materials, explosives, and personnel are inspected prior to transporting explosives and inspections per the Navy's Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials (Attachment B, Exhibit B-7). The MCAS Yuma EOD personnel assigned to each truck will clean and service it at the end of each day's operations. Additionally, they will draw and stow any required replacement hardware, such as chains or shovels, and inform the OIC of any expenditures. If a vehicle breakdown occurs during operations, the crew will report it to the OIC for call-in to mobile maintenance.

If inspections reveal that non-emergency maintenance is required at the MTR, then Environmental Department personnel will initiate immediate action(s) to preclude further damage and to reduce the need for emergency repairs. If a hazard is imminent or has already occurred during the course of an inspection, or any time between inspections, then remedial action will immediately be taken in accordance with the Permit Contingency Plan. Appropriate authorities will be notified according to the Permit Contingency Plan (Attachment F). In the event of an emergency involving the release of hazardous constituents to the environment, efforts will be directed towards containing the hazard, removing it, and subsequently decontaminating the affected area as outlined in the Contingency Plan (Attachment F).

E.3 Preparedness and Prevention

MCAS Yuma does not request a waiver of the preparedness and prevention requirements. The MTR is designed and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste to the environment which could threaten human health or the environment. Specific operating procedures include detonation of waste ordnance immediately upon arrival at the MTR, regular inspections, treatment of hazardous (including reactive) debris from detonation operation, and collection of non-hazardous debris for recycling.

An RSO is present during all MTR operations. The RSO's responsibilities are detailed in the MCAS Yuma EOD SOP (Attachment A, Exhibit A-1). They include, but are not limited to:

- Overseeing all safety regulations and ensuring that the required safety equipment is used.
- Accounting for all explosives treated and completing the Explosive Ordnance Disposal Information Management System (EODIMS) report (Attachment B, Exhibit B-4).
- Conducting a thorough safety briefing per the MCAS Yuma Range Regulations for all MCAS Yuma EOD personnel involved in the operation.
- Verifying that two-way communication checks are conducted prior to conducting the operation.
- Providing the qualified medical personnel with a copy of the Emergency Procedures.
- In the event of an emergency or accident, verifying that all operations have stopped, assisting in the initiation of emergency procedures, and following the directions of the OIC.

In addition, the OIC is responsible for ensuring that pre-operation tasks, range operation tasks, and post-operation tasks are completed before, during, and after every MTR event to ensure preparedness and to prevent emergencies from occurring, recurring, or spreading to other parts of the facility.

Because of the inherent dangers involved in EOD operations, it is imperative that adequate two-way communications be available during all operations. Cellular/satellite phones or radios will be

used as a means of two-way communication. This allows communication with safety networks including Range Operations, Range Scheduling, Air Traffic Control, and MCAS Yuma EOD.

To establish two-way communication for every operation, MCAS Yuma EOD personnel contacts Range Scheduling or Air Traffic Control (via cellular/satellite phone or radio) to notify them of the start of operations prior to arriving at the MTR. Operations will not begin until two-way communication is established. If during an operation, two-way communication is lost, all operations will cease until positive communications are re-established.

If re-establishment is unsuccessful, Range Management will dispatch a vehicle to the MTR to ensure that there has not been a mishap. If the qualified medical personnel, or the OIC in his absence, decides to MEDEVAC injured or sick personnel, he will notify Range Management by radio (primary) or cellular/satellite phone (alternate). He will provide information detailing the number of personnel injured, a brief description of the incident and nature of injuries, name, rank, unit for each injured person, location and grid coordinates, type of MEDEVAC being requested (air or ground), and where the MCAS Yuma EOD safety vehicle will meet the ambulance, or how the landing zone will be marked (smoke, truck, air panel, etc.).

Two fire extinguishers (1 water [9.5 pounds] and 1 dry chemical [20 pounds]) are required to be in the onsite MCAS Yuma EOD trucks, during each event. All fire extinguishers are inspected monthly by the MCAS Yuma fire department (inspection records are maintained at the fire department) and are required to be checked (verify that extinguisher is present and does not require recharge) before and after each event. The Permit Contingency Plan (Attachment F) details actions to be taken in case of an emergency.

Arrangements with local authorities (40 CFR 264.37) are discussed in the Permit Contingency Plan (Attachment F).

E.4 General Hazard Protection

Explosive ordnance is loaded and unloaded by trained personnel. Munitions are placed directly onto/into the specific treatment locations for OD operations. Following a treatment event, non-hazardous metal scrap is collected for recycling.

Runoff of any hazardous waste from the OD units is not likely. It is also unlikely that any water supplies would be impacted. The hydrologic and hydrogeologic characteristics of the MTR are presented in Attachment D.

MCAS Yuma EOD operations take place in remote locations on the BMGR where there are no installed utilities. Operations can continue as long as natural lighting is adequate and during the time periods specified in MCAS Yuma's Open Detonation Permit and permit conditions. The OIC is responsible for monitoring the available light and making all decisions concerning the ordnance disposal operations.

During all ordnance disposal operations, each member of the MCAS Yuma EOD division wears adequate personal protective equipment (PPE) when handling munitions, residue, or scrap metal. Protective clothing for disposal operations where detonation is the primary hazard is the Camouflage Utility Uniform/Flame Retardant Clothing with steel-toed boots and a helmet. Protective clothing for disposal operations where fire is the primary hazard is also the Camouflage Utility Uniform/Flame Retardant Clothing, gloves, helmet and steel-toed boots. Steel-toed boots are worn to protect against hazards such as falling debris and heavy tools. Sleeves are rolled down during these operations. During disposal operations of exposed white phosphorous, a face shield is also worn in addition to the other clothing.

E.5 Prevention of Accidental Ignition or Reaction of Wastes

All explosive waste is kept from sources of ignition or reaction and where ignitable or reactive waste is being handled, the owner or operator must confine smoking and open flame activities to specially designated locations. “No Smoking” signs must be conspicuously placed wherever there is a hazard from ignitable or reactive waste [40 CFR 264.17(a)]. MCAS Yuma EOD personnel are very familiar with OD procedures, further minimizing the chance for accidental ignition or reaction of wastes.

In transporting explosive ordnance for treatment at the BMGR, certain precautions are taken to ensure that ignition or reaction of wastes is prevented. The reactive wastes are packaged securely, segregated by separating incompatible items, secured on vehicles and transported according to United States Department of Transportation (DOT) regulations. Incompatible wastes are not mixed for transportation to or at the BMGR. All transportation and shipment of explosive ordnance follows the Navy’s Shipping Inspector’s Manual for Ammunition, Explosives and Related Hazardous Materials (Exhibit B-7).

Exhibit E-1
MTR Inspection Checklist

ITEM	CONDITION				INITIALS	SIGNATURE
SECURITY DEVICES (Weekly)	**SAT**	**UNSAT**	**NA**	**NI**	**PROBLEM OBSERVED**	**DATE CORRECTIVE ACTION TAKEN**
Security of Gates						
Security of Fences/Warning Signs						
Evidence of Tampering						
Evidence of Damage						
Other						
RANGE AREAS (Weekly)						
Main and Perimeter Roads						
Flagpoles						
Emergency Crew Shelters						
Vegetation Encroachment						
Other						
COMMUNICATIONS EQUIPMENT (Annually)						
Test of Radios						
Test of Cellular/Satellite Phones						
OTHER EQUIPMENT (In Vehicle) (Annually)						
Fire extinguishers						
Shovels						
Portable Eyewash						
5-gallon Water Container (Portable)						
First Aid Kit						
PPE (Annually)						
Gloves						
Respirator						
Eye Protection						

Legend: SAT – Satisfactory UNSAT – Unsatisfactory NA – Not Applicable NI – Not Inspected

PRINT	SIGNATURE	DATE / TIME

Exhibit E-2
MTR Signage

ATTACHMENT F
CONTINGENCY PLAN

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F.3 Implementation of the Contingency Plan 2
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F.4.1 Notification 3
F.4.2 Evacuation Routes 3
F.4.3 Containment and Control 4
F.5 Record Keeping and Reporting 6
F.6 Emergency Equipment 7
F.7 Coordination Agreements 7
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F.7.2 Support Agencies 8
F.7.3 Method of Contact 8
F.8 Required Reports 8

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Figure F-2 MTR Location Map
Figure F-3 MTR Site Map
Figure F-4 Hospital Route Map

List of Exhibits

Exhibit F-1 List of Emergency Coordinators

Exhibit F-1
Emergency Coordinators

Emergency Coordinators:

MCAS Yuma Environmental Primary Emergency Coordinator
Thomas Sheffield
Hours: 0730-1630; Phone: (928) 269-2936
Hours: 1630-0730; Phone: (928) 941-1624
Address: 328 E. Spears St. Yuma, AZ 85365

MCAS Yuma Environmental Alternate Emergency Coordinator
Anthony Burton
Hours: 0730-1630; Phone: (928) 269-2605
Hours: 1630-0730; Phone: (928) 269-2252
Address: 328 E. Spears St. Yuma, AZ 85365

MCAS Yuma Environmental Alternate Emergency Coordinator
Heather De Jesus
Hours: 0730-1630; Phone: (928) 269-6669
Hours: 1630-0730; Phone: (928) 269-2252
Address: 328 E. Spears St. Yuma, AZ 85365

ATTACHMENT F
Contingency Plan

The information contained herein is submitted in accordance with the requirements for a contingency plan as specified in 40 CFR 270.14(b)(7) and 264.50-264.56.

F.1 General Information

This contingency plan is dynamic in that it requires updates as conditions change. It is important to keep this portion of the permit updated. Some of the situations that will require revisions to the contingency plan include: (1) the facility permit is revised, (2) the plan is inadequate in an emergency, (3) the procedures herein can be improved, (4) the facility operations change in a way that alters the plan, (5) the emergency coordinator changes, and/or (6) the emergency equipment list changes. Administrative amendments to this plan must be initiated by MCAS Yuma Environmental Department and MCAS Yuma EOD. As for Class 1 modifications, the permittee must notify the Director concerning the modification by certified mail or other means that establish proof of delivery within 7 calendar days after the change is put into effect. This notice must specify the changes being made to permit conditions or supporting documents referenced by the permit and must explain why they are necessary. Adopted changes will be provided to all the members on the facility mailing list, and record holders of this permit.

Copies of this Contingency Plan are available at MCAS Yuma EOD and Environmental Department offices located on the MCAS Yuma Main Base. Copies of this plan will also be provided to the MCAS Fire Department and the Onvida Health Hospital. Important information is briefly summarized as follows:

- Name: Munitions Treatment Range, BMGR
- Location: Portions of Yuma County
- Owner: United States Marine Corps
- Operators: MCAS Yuma Environmental Department
- EPA Identification No.: AZ4570024139
- Emergency Coordinators: See Exhibit F-1
- Facility Type: The MTR is used to treat munitions by open detonation.
- Facility Site Plan: See Figures F-1, F-2, F-3
- Description of Activities: MTR - Open detonation of waste explosive ordnance.

F.2 Emergency Coordinators

In the event of an emergency, the OIC will contact Range Management via radio or cellular/satellite phone. Range Management will then contact the emergency coordinator, and additional assistance, if required. The contingency plan must list the names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator, and the list must be kept up to date. Where more than one person is listed, one must be named as primary emergency coordinator and others must be listed in the order in which they will assume responsibility as alternates. The list of the current emergency coordinators is found in Exhibit F-1.

The emergency coordinators organize, control, and direct cleanup efforts at the scene should an incident involve the transportation, handling, or demolition of explosive waste items. The emergency coordinators can designate other personnel (generally, the OIC onsite) to assist them in the event of an emergency. The emergency coordinator or designee has the full authority to obtain fire and medical support services should the need arise.

At all times there shall be at least one employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures.

F.3 Implementation of the Contingency Plan

The contingency plan will be implemented in the event of an incident involving waste munitions that may threaten human health or safety or the environment. Emergency coordinators have full authority to implement this plan. Qualified medical personnel are required to be on site for each event. The qualified medical personnel will be equipped with a full emergency triage medical kit. Depending on the degree of severity, the following potential emergencies might require implementation of the contingency plan:

- Fire
- Unplanned explosion
- Diesel fuel or gasoline spill
- Sudden severe weather conditions
- Animal, snake or insect bite

A sudden release of hazardous waste is not expected to occur at the MTR, because there is no onsite storage of hazardous waste allowed at this facility.

F.4 Emergency Response Procedures

An incident that creates an actual or potential imminent threat to human health, including public safety, or the environment, including property, is considered an explosives emergency, and emergency procedures will be followed.

F.4.1 Notification

Any MCAS Yuma EOD personnel discovering an emergency condition must alert other team members and the OIC who will assess the situation, order a withdrawal if necessary, and notify Range Management of events and course of action. The Emergency Coordinator and the Environmental Departments must also be immediately notified about any unusual or emergency conditions. When there is any implementation of the Contingency Plan and immediately following the above MCAS Yuma notifications, the emergency coordinator shall notify ADEQ by calling (602) 771-2330 or (800) 234-5677 for any incident requiring implementation of the Contingency Plan.

If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows:

- If the assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities and be available to help appropriate officials decide whether local areas should be evacuated; and
- He must immediately notify either the government official designated as the on-scene coordinator for that geographical area, or the National Response Center (using their 24-hour toll free number 800/424–8802). The report must include:
    - Name and telephone number of reporter;
    - Name and address of facility;
    - Time and type of incident (e.g., release, fire);
    - Name and quantity of material(s) involved, to the extent known;
    - The extent of injuries, if any; and
    - The possible hazards to human health, or the environment, outside the facility.

F.4.2 Evacuation Routes

In the event of an accident, incident, or explosive mishap, all operations will cease. The emergency signal will be given (continuous sounding of a truck siren for one minute). All personnel not in a danger area will report to the designated safe area (designated during the safety meeting held before each event). All site personnel will be accounted for at the muster point in the designated safe area. Personnel in an immediate threat area will seek shelter in the emergency bunkers located on the MTR. All personnel will remain in the designated safe area/emergency bunkers until the All Clear (two 30-second bursts of a truck siren) is given. Except for evacuating any injured personnel, the accident, incident, or explosive mishap area will not be disturbed.

If the qualified medical personnel, or the OIC (in the medical personnel's absence), decides to MEDEVAC injured or sick personnel, he will notify Range Management by radio (primary) or cellular/satellite phone (alternate). He will provide information detailing the number of personnel injured, a brief description of the incident and nature of injuries, name, rank, and unit for each injured person, location and grid coordinates, type of MEDEVAC being requested (air or ground), and where the MCAS Yuma EOD safety vehicle will meet the ambulance, or how the landing zone will be marked (smoke, truck, air panel, etc.).

MCAS Yuma does not have a dedicated Search and Rescue capability. If notified of an emergency medical situation, Range Management may request a civilian air ambulance to support the transport of injured personnel off range spaces. If evacuation by a civilian air ambulance is unavailable or not necessary, several ground safety vehicles will respond to the MEDEVAC notification. Emergency route directions (via ground) from MCAS Yuma Main Base to the MTR and from the MTR to Onvida Health hospital are provided in Figure F-4.

F.4.3 Containment and Control

The senior MCAS Yuma EOD technician or Environmental Coordinator (EC) will notify the Range Management office (which will in turn notify appropriate organizations identified in Attachment F.7) and advise team members of safe re-entry procedures.

F.4.3.1 Ordnance Transportation Vehicles

- Explosion. In the event of an explosion, personnel will immediately withdraw to a safe distance without the vehicle and evaluate the situation.

- Vehicle Fire. All ordnance transportation vehicles are equipped with two portable fire extinguishers. In the event of a fire involving a transport vehicle with ordnance on-board, personnel will descend from the vehicle, and if based on personnel's judgment, the fire is localized and far enough away from ordnance (i.e., indicating no likelihood of explosion), an attempt to control the fire with available extinguishers may be permissible. If the fire is too close to ordnance or spreading quickly, personnel will withdraw to a safe distance and advise the MCAS Yuma station fire dispatch. The station fire dispatch will evaluate the situation and determine if the fire department, or crash fire rescue, should be dispatched to the site.

F.4.3.2 Material Spill

The MTR does not treat any material or item with spill potential; all treated munitions are solids and are contained within the munitions. Further, water is not contained at the site, and decontamination activities involving liquids do not occur at the MTR.

In the event of a diesel fuel spill, the following procedures will be followed as closely as possible, depending on the situation:

- All unnecessary personnel will be removed from the area.

- All ignition sources will be removed from the affected area.

- If possible, without compromising safety, personnel may attempt to stop the leak at its source.

- Leaking fuel will be contained by the best means available for the situation. On a hard surface, absorbent materials such as vermiculite will be used to contain and clean up a spill. On soil, shovels will be used to construct a dike around the spill to contain lateral movement.

- Range Management personnel will contact support personnel if assistance is required.

All containment and cleanup materials will be placed in drums for proper disposal. These drums will be properly labeled.

F.4.3.3 Sudden Severe Weather Conditions

In the event of unforeseen sudden severe weather conditions, treatment operations will cease if possible. The decision to cease treatment will be made by the OIC considering safety factors. The OIC is responsible for reinstating or reorganizing the treatment operation(s). OD operations are not permitted in severe weather, and it is the responsibility of MCAS Environmental Department to ensure operations are conducted only on days when the weather is expected to be clear and non-windy all day.

F.4.3.4 Animal, Snake, or Insect Bite

To prevent and protect against animal, snake, or insect bites, insect repellent and protective clothing (leather boots, long pants, hat, gloves) will be used as necessary.

Any personnel suspected of being bitten by a poisonous insect, snake, or animal will receive immediate medical attention. If any personnel are bitten and are known to be allergic or show signs of an allergic reaction, he or she will receive immediate medical attention.

F.4.3.5 Emergency Coordinator Measures

The emergency coordinator (or designee) will employ these measures to protect personnel and equipment at the emergency location:

1. Limit the number of personnel involved at the scene.

2. Insist on use of personnel protective clothing and equipment deemed necessary for the particular incident.

3. Evaluate the hazards and risks involved relative to life, safety, and property hazards and determine a safe operating mode.

4. Set up a command post at the scene and establish communications with Range Management.

5. Follow safe practices and procedures in handling the particular incident.

6. Coordinate with other qualified emergency response personnel, even though the personnel are at offsite locations, to ensure that safety and health are not jeopardized. Note: Although response times for additional personnel to arrive on scene may be lengthy, this does not preclude seeking the best information available while they are in route.

F.4.3.6 Follow-up Actions

Following containment and control of the emergency, the OIC will:

1. Start actions to collect, treat, and dispose of non-explosive waste or other materials, as appropriate. This will be a joint operation involving MCAS Yuma EOD, fire, safety, and environmental personnel, in accordance with RCRA.

2. Ensure that MCAS Yuma EOD, fire, and safety personnel investigate the cause of the emergency and provide a technical report to the Station Commander within 72 hours.

3. Ensure that proper restoration actions are started as soon as possible after appropriate explosives decontamination procedures have been completed. This will be a joint operation between Safety and Public Works Engineering personnel. All decontamination actions will be documented and the records maintained permanently at MCAS Yuma EOD, Environmental, Safety, and real estate offices.

4. Ensure that equipment repaired or replaced as a result of the incident is re-certified, as necessary, prior to being placed.

F.5 Record Keeping and Reporting

Written operating records of all operations conducted at the MTR will be maintained in the Explosive Ordnance Disposal Information Management System (EODIMS) report. The following information must be recorded and maintained in the operating record until the facility is closed:

1. The quantity of hazardous waste received, the specific manifest document numbers (if the waste was accompanied by a manifest), the date of its treatment, and the amount/type of explosives used will be recorded on the EODIMS report.

2. The hazardous waste treatment location (i.e., the MTR).

3. Records and results of waste analyses and trial tests, as available.

4. Summary reports and details of all incidents that require implementing emergency procedures as specified in 40 CFR 264.56(i).

5. Records and results of inspections as required by 40 CFR 264.15(d).

6. Monitoring, testing, or analytical data, and corrective action when required.

7. Mishap Investigation Reports in the event of accident/incident.

F.6 Emergency Equipment

The following equipment is the minimum amount of emergency equipment that will be taken on all MTR operations:

- Safety vehicle - equipped with radio, emergency lights, cellular phone, and siren.
- Fire extinguishers.
- Shovels.
- Handheld radios.
- Medical kit (provided by the onsite qualified medical personnel).
- Portable eyewash.
- 5-gallon container with water.

In addition to the minimum amount of emergency equipment taken on all MTR operations, the following equipment must be taken on all white phosphorus operations at the MTR:

- M40 Gas Mask.
- Sodium Bicarbonate.
- 5-gallon bucket.

F.7 Coordination Agreements

In the event of an emergency, the agencies listed in the following subsections should be contacted for support and action. Arrangements with Onvida Health Hospital (formally known as Yuma Regional Medical Hospital) were attempted but no final agreement was reached.

F.7.1 Primary Action Agencies

- MCAS Yuma Range Management: (928) 269-7080

- MCAS Yuma EOD: (928) 269-2788
- MCAS Yuma Provost Marshal Office: (928) 269-2205
- MCAS Yuma Fire Department: (928) 269-2333 or 2285
- Onvida Health Hospital: (928) 336-2000
- MCAS Yuma Environmental Department: (928) 269-3201

F.7.2 Support Agencies

- Yuma County Sheriff: (928) 783-4427
- ADEQ: (602) 771-2330 or (800) 234-5677
- Other agencies as deemed necessary by the emergency coordinator

F.7.3 Method of Contact

In the event of any type of emergency, the OIC, the qualified medical personnel, or other MCAS Yuma EOD personnel in their absence, will contact Range Management by radio. Range Management personnel will contact any other support personnel as necessary. All agencies with which coordination agreements are maintained are familiar with all aspects of this Contingency Plan. ADEQ will be immediately notified upon any contingency plan implementation.

F.8 Required Reports

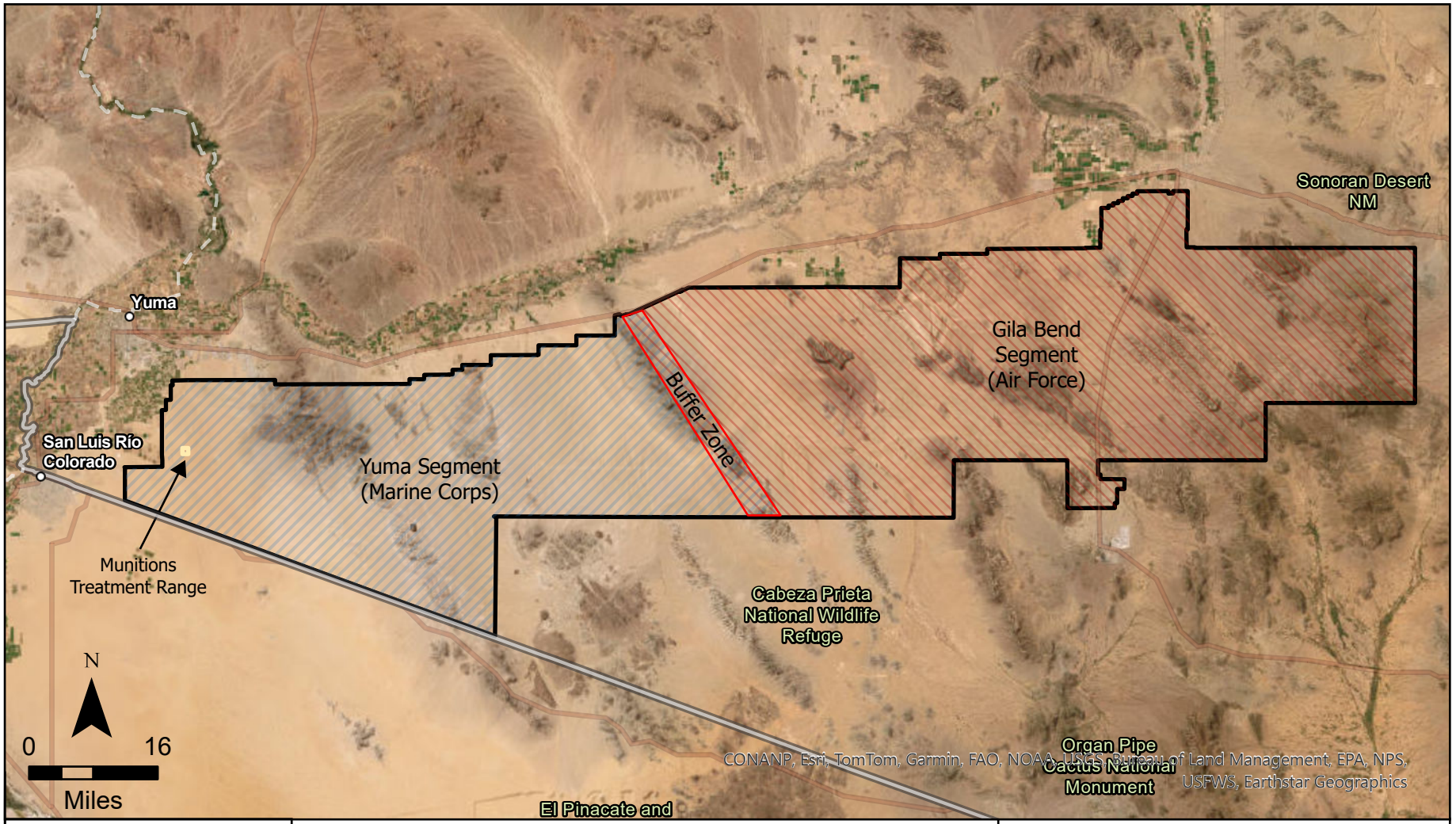
The emergency coordinator will notify appropriate MCAS Yuma authorities of the incident and the follow-up actions implemented. The emergency coordinator will advise the Station Commander of changes required in the contingency plan based on experience acquired during each emergency situation. Changes will be provided to each recipient of the original plan. A final report on incidents will be submitted to the Station Commander, in his capacity as the owner of the facility and permit holder. Within 15 days after the incident, a written incident report must be submitted to ADEQ. The report must include:

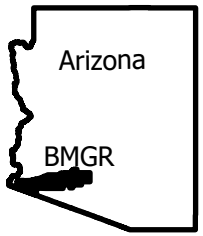
- The name and telephone number of the reporter,
- The name and address of the facility,
- The time and type of incident (for example, release, fire),
- The name and quantity of material(s) involved, to the extent known,

- The extent of injuries, if any,
- An assessment of actual or potential hazards to human health or the environment, where applicable, and
- An estimated quantity and disposition of recovered material resulting from the incident.

Figure F-1

Area Location Map





Munitions Treatment Range

Yuma Segment (Marine Corps)

Gila Bend Segment (Air Force)

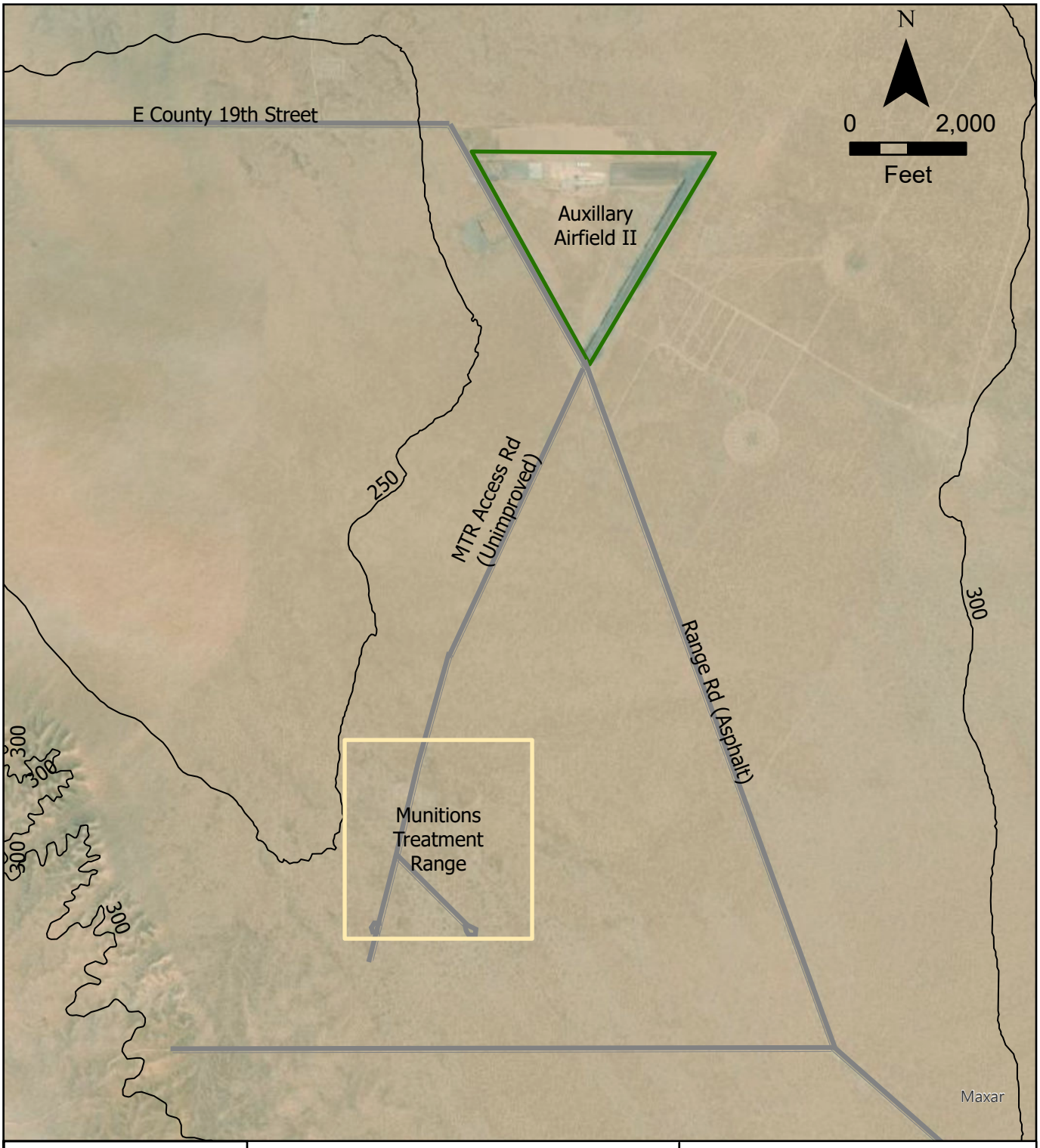
Buffer Zone

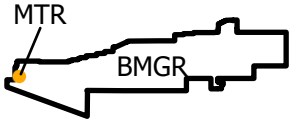
BMGR Boundary

Figure F-1
Area Location Map
Barry M. Goldwater Range

Figure F-2

MTR Location Map





Munitions Treatment Range

Ground Elevation (feet)

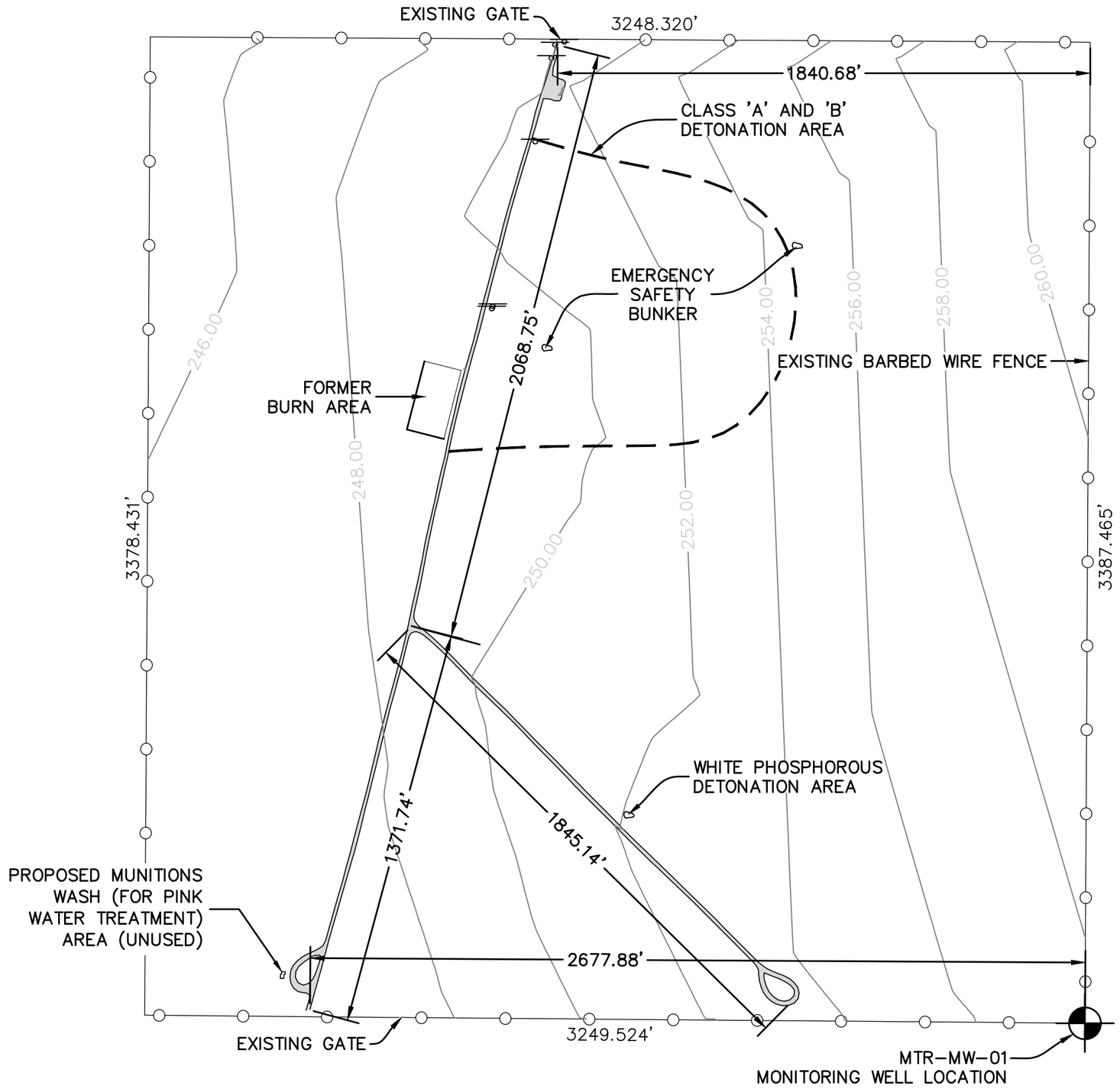
Roads

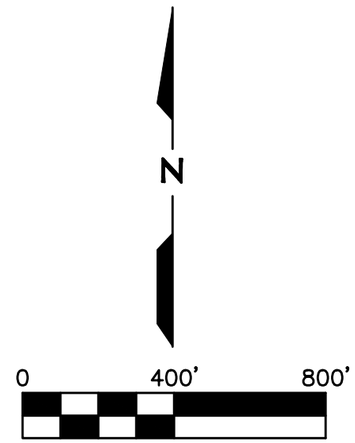
Auxillary Airfield II

Figure F-2
MTR Site Location Map
Barry M. Goldwater Range

Figure F-3

MTR Site Map





MUNITIONS TREATMENT RANGE
BARRY M. GOLDWATER RANGE
MCAS YUMA, YUMA, ARIZONA

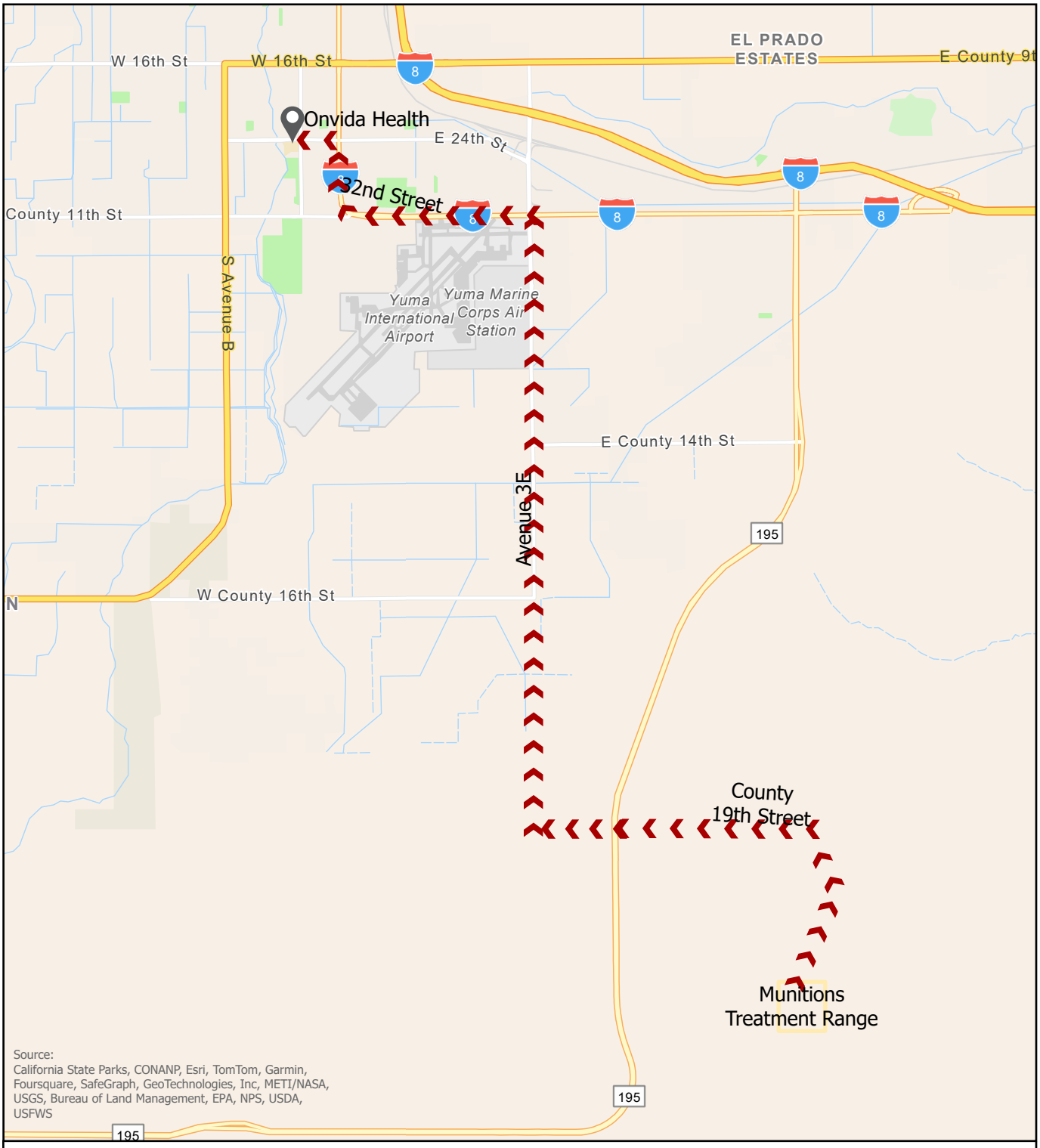
MTR SITE MAP

FIGURE F-3

SCALE:	AS SHOWN
DATE:	FEB, 2025
DES. BY:	DESIGNER
DRAWN BY:	STAFF
SURVEYED BY:	STAFF
JOB. No.:	20D-5006.X0130
SHEET	– OF –

Figure F-4

Hospital Route Map



N

0 10,000

Feet

Figure F-4
Hospital Route Map
Onvida Health
2400 S Avenue A
Yuma, AZ 85364
928-336-2000

ATTACHMENT G
PERSONNEL TRAINING

Table of Contents

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G.2.1 Responsibilities and Duties 2
G.2.2 Work Assignment and Review 3
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G.4 Training Director 3
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ATTACHMENT G
Personnel Training

The information contained in this section outlines training programs for personnel performing EOD operations on the MTR training each year. EOD personnel training will be performed in accordance with 40 CFR 270.14(b)(12) and 40 CFR 264.16(a)(3).

G.1 Training Program

The MCAS Yuma EOD training program is designed to ensure that all MCAS Yuma EOD personnel are proficient in performing every activity involved in EOD destruction including handling and conducting treatment of various munition types, operating and maintaining EOD equipment, disassembling and inerting ordnance.

Formal training to qualify personnel for assignment to EOD duty involves basic training. Basic EOD training is provided by the Naval School Explosive Ordnance Disposal (NAVSCOLEOD), Elgin Air Force Base, Florida resulting in certification as an enlisted technician or officer.

The objective of basic training is to train officers and enlisted personnel in the best methods and procedures for performing explosive ordnance reconnaissance, identification, access, recovery, and disposal. The training encompasses all necessary requirements to operate on the MTR. Trainees are informed that these operations will generate RCRA hazardous waste. They are educated on the management of this waste including disposition of the debris. The training focuses on assessment and re-treatment of detonation debris to ensure no hazardous components are transported off-site.

EOD officers and technicians are also trained in various core competencies pertinent to the operations at the MTR. EOD personnel receive a minimum of 10 hours of continuing competency training each year. The training may be comprised of classroom and/or field training and will be designed to cover one or more of the following topics:

- Render safe of explosive ordnance
- Disassembly and inerting
- Advanced tactic, techniques, and procedures for EOD tools and equipment
- Electronics
- Open burn and open detonation techniques
- Destruction of explosive ordnance
- Explosive ordnance exploitation
- Explosive ordnance reconnaissance

EOD technicians and officers also receive the following training on an annual basis:

- HAZWOPER Refresher
- DOT refresher
- Hazardous waste facility permit refresher.

Annual RCRA refresher training is also required of EOD personnel. The refresher training is a

minimum of 8 hours of classroom training and is performed by the Environmental Department of MCAS Yuma. Detailed training records are maintained at the EOD office. Once assigned to EOD, EOD technicians and officers are required to take advanced training classes for promotion to a higher rank within the EOD unit.

G.2 Job Titles and Duties

EOD personnel are generally senior personnel with several years of experience and formally tested capabilities. Specific individuals at MCAS Yuma are not named in this permit since all military personnel are subject to reassignment. Letters of appointments with names, job descriptions, and responsibilities are maintained until closure of the facility or for a period of five years after personnel have been transferred or separated from this command. Appropriate information about these individuals is on the rosters maintained at the respective command posts. The duties, responsibilities, and qualifications of EOD personnel are discussed below.

G.2.1 Responsibilities and Duties

The three key EOD personnel who plan, coordinate, and direct EOD operations are:

- Officer in Charge (OIC)
- Operations Officer (OpsO)
- Range Safety Officer (RSO)

These personnel interpret regulations and develop necessary operating procedures, as required. They determine requirements for manpower, space, and equipment, and initiate required actions.

The OIC is responsible for the organization and safe conduct of all MTR operations. Overall responsibilities include: ensuring that the training of all EOD personnel is current and documented, ensuring that regulations and permit requirements are met, supervising all MTR tasks, and ensuring complete documentation. The OIC must review the Standard Operating Procedures (SOPs) for MTR tasks and ensure that all EOD personnel comply with written SOPs.

The OpsO is responsible for assisting the OIC with the organization and safe conduct of all MTR operations. Overall responsibilities include: assuming the duties of the OIC in his absence; preparing the Operations Order, Lesson Plan, Disassembly and Inerting Procedures for the operation; assigning personnel duties; and completing the appropriate documentation.

The RSO is responsible for overseeing safety regulations and ensuring the required safety equipment is used. Overall responsibilities include conducting a safety brief as per the SOP, verifying that all safety equipment is operable, notifying the qualified medical personnel of the Emergency Procedures, and completing the appropriate documentation.

G.2.2 Work Assignment and Review

The OIC assigns work to subordinate employees or supervisors, based on priorities. The OIC also makes decisions on work problems referred by team members and assure that workload and project responsibilities are clearly delegated. The OIC is responsible for reviewing all personnel involved in EOD operations.

G.3 MCAS RCRA Training Content, Frequency, and Techniques

The RCRA training program employed for all EOD personnel handling explosive ordnance and potentially hazardous wastes combines supervised on-the-job instruction and formal classroom training. Facility personnel must successfully complete the RCRA training program within six months after the assignment date of their hazardous waste-related position at MCAS Yuma. Personnel must not work in unsupervised positions until they have completed the RCRA training program. Assigned personnel learn about particular dangers associated with hazardous wastes. The information presented to EOD personnel on an annual basis is adopted from the basic RCRA training program presented to other installation personnel. This training is performed by the Environmental Department at MCAS Yuma. The RCRA Training Program presented at MCAS Yuma includes:

- The Hazardous Waste Program
- Hazardous Waste Laws and Regulations
- DoD Regulations, Policies and Memorandums
- Hazardous Properties
- Health and Environmental Effects
- Personal Safety
- Hazardous Waste Identification
- Generator Standards
- Storage in Tanks
- Compatibility
- Contingency Planning
- Department of Transportation Identification
- Labeling
- Packaging
- Handling Hazardous Wastes
- Transportation of Hazardous Wastes
- Emergency Response

G.4 Training Director

RCRA training is conducted under the direction of the MCAS Yuma Environmental Department. The OIC is responsible for ensuring that assigned personnel receive adequate training in handling potentially hazardous wastes.

G.5 Records

Records of previous and ongoing training courses are maintained at the EOD office. Personnel training records are maintained for at least five years after personnel have left the command. Training records include letters of appointment with job description and responsibilities, a copy of the annual 8-hour Hazardous Waste Management refresher course certificate, copies of Naval Explosive Ordnance Disposal School course and refresher certificates, and copies of certificates of completion for any other environmental or explosive courses. Training records on current personnel must be kept until closure of the facility.

G.6 Relevance of Training to Job Position

The EOD training program is designed to ensure that all EOD unit members are proficient in performing every EOD procedures including handling and conducting treatment of various munitions types, operating and maintaining EOD equipment, and disassembling and inerting ordnance, management of detonation debris to ensure there is no threat to human health and environment. The subsequent paragraphs provide an overview of some relevant areas of training performed at the Naval School in Florida.

As part of the Core Division in the basic NAVSCOLEOD course, students are taught to use the Mobile Field Kit (MFK) to quickly and accurately identify ordnance, and to conduct ordnance reconnaissance and research to gather information about the ordnance and its potential hazards. The skills taught in this division become the critical foundation necessary to successfully accomplish the EOD mission, as EOD technicians must be able to safely and effectively identify, handle and dispose of ordnance in a variety of environments

In the Demolition Division, EOD technicians are taught basic mathematical conversions and equations, military explosive and demolition materials, explosive transportation and storage requirements, explosive firing systems, ordnance disposal and specialized explosive techniques, and burn operations. The training emphasizes the importance of safety and the use of standardized procedures to minimize the risk of injury or death. EOD technicians are trained to use demolition techniques in a variety of environments, including urban and rural areas, and to respond to a wide range of scenarios.

In the Tools and Methods Division, EOD technicians receive instruction on the use of explosively actuated tools and other methods necessary to accomplish the EOD mission. The training covers the buildup, placement, and live fire of explosively actuated tools, tape and line procedures, various ordnance locators and metal detectors, rigging, access and recovery, metallic shielding, fuze gagging, and lodged projectile removal.

In the Ground Ordnance Division, EOD technicians undergo intensive training and evaluation on the identification, rendering safe, and disposal of ground ordnance. This division specifically focuses on grenades, rockets, projectiles, and landmines. EOD technicians are individually evaluated and tested on their ability to complete these tasks within a set time limit while adhering

to critical safety criteria and following crucial procedures set by EOD 60 series publications.

The Air Ordnance Division requires EOD technicians to be trained and evaluated on the identification, render safe, and disposal procedures of aircraft explosive hazards and aviation ordnance. This division focuses specifically on aircraft explosive hazards (AEH), guided missiles, bombs, dispensers, and their payloads. EOD technicians are trained to use identification and reconnaissance techniques set by EOD 60-series publications, EOD tools, and demolition materials in practical application scenarios. They are evaluated on their ability to apply these skills and techniques in handling and disposing of aircraft explosive hazards and aviation ordnance safely and effectively.

In the Improvised Explosive Device (IED) Division, EOD technicians are taught the IED fundamentals, including component recognition, construction, diagnostics, neutralization/targeting, operations, robotics, and disposal procedures. The division emphasizes the importance of understanding the construction and components of IEDs, as well as the use of diagnostics such as X-ray, to determine the appropriate course of action for neutralization or disposal. Technicians are trained to use robotics and other specialized tools to safely and effectively handle and dispose of IEDs. The division also covers the procedures for disposal of IEDs in both permissive and non-permissive environments.

G.7 Training for Emergency Response

All EOD personnel are prepared and responsible in case of emergency and have been trained in handling explosive ordnance and potentially hazardous waste, and in responding to emergency situations.

Personnel protection, hot line procedures, and EOD emergency response procedures training is a core element of both the basic and advanced NAVSCOLEOD programs and is stressed throughout the programs.

In addition, on-the-job training requires EOD personnel to be familiar with various Naval Instructions, official publications, Station Orders, base-specific SOPs and emergency procedures.

ATTACHMENT H
CLOSURE PLAN

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H.3 Notification of Closure and Notice to Local Land Authority....3

List of Exhibits

Exhibit H-1 Sampling and Analysis Plan for Closure

Exhibit H-2 Site Safety and Health Plan

ATTACHMENT H
Closure Plan

This section is submitted in accordance with the requirements of 40 CFR 264.110 through 264.115. A post closure plan is not expected to be required since no contaminants will be left in place at closure. Permit Attachment H is a draft Closure Plan. If in the future, the Permittee decides to close the MTR, the permittee must submit a revised closure plan for ADEQ approval no later than ninety days prior to closure, and in accordance with the permit modification procedures of R18-8-270.A (40 CFR 270.41, 40 CFR 270.42 et seq.) The Permittee cannot commence with any of the steps (e.g., notification of closure) involved in final closure of facility without formal approval for its revised closure plan from ADEQ.

This plan identifies all steps that will be necessary to close MCAS Yuma's MTR at the end of its intended operating life. The MCAS Yuma Environmental Department will maintain the closure plan record copy. This plan will be updated by issuing either page changes or new copies, as appropriate, to all plan addressees.

H.1 Closure Performance Standard

This closure plan is designed to ensure that the MTR is a clean closure, in accordance with State and Federal regulations, without a requirement for post-closure monitoring (40 CFR 264.111(a)). Clean closure requires demonstration that any hazardous substances remaining onsite do not pose a threat to human health or the environment (40 CFR 264.111(b)), and that closure is conducted in accordance with applicable regulations (40 CFR 264.111 (c)). This demonstration can be made by ensuring that onsite concentrations of hazardous substances are at or below regulatory health-based standards. Background concentrations of metals in soil are also a consideration when performing constituent comparison analyses.

H.2 Final Closure Activities

Closure of the MTR is not currently planned. However, should future circumstances or decisions require the operator to discontinue operations; the procedures for final closure described below will be followed. Soil sampling will be conducted per the Sampling and Analysis Plan for the MTR (Exhibit H-1) and in accordance with the Site Safety and Health Plan (Exhibit H-2). If no contaminants exceeding action levels are found to be present, the MTR will be graded over. If contaminant concentrations in soils are found to exceed action levels [based on soil remediation levels (SRLs)], further action will be taken upon consultation with ADEQ.

H.2.1 Maximum Extent of Operations

The type and maximum extent of operations is described in detail in Attachment C.

H.2.2 Maximum Inventory and Waste Removal

The OD areas are used to treat listed hazardous waste (i.e., EPA Waste Code D003-Reactive). Current practices preclude the storage of any explosive waste material on the BMGR, and for safety reasons, this prohibition will continue to be enforced.

Soil potentially impacted above action levels from historic treatment efforts, if encountered, will be addressed as residuals as described in the closure decontamination process (Attachment H).

H.2.3 Closure Decontamination Procedures

Following the final OD operations at the MTR, the facility will be closed. Inventory disposal will not be of concern because the final volume of explosive ordnance would have been treated by detonation.

The OD areas will be inspected for any unexploded ordnance, debris, ash, and staining. Any unexploded ordnance would be subjected to additional detonation processes, until no identifiable material remained. Soil sampling will be conducted per the Sampling and Analysis Plan for the MTR (Exhibit H-1). If no contaminants exceeding action levels are found to be present, the MTR will be graded over. If contaminant concentrations in soils are found to exceed action levels, further action will be taken upon consultation with ADEQ.

Upon ADEQ-approved clean closure, no post-closure monitoring is required.

H.2.4 Schedule for Closure

The BMGR is an integral part of the defense system of the United States; it is not anticipated that final closure will occur. However, a final closure date of 2064 (i.e., 40 years) has been estimated.

Closure activities will begin no later than 30 days after final OD operations are conducted. Within 90 days after the receipt of the final volume of hazardous wastes to be treated, all waste must be removed from the site. Closure must be completed within 180 days.

Notification of intent to close must be sent to ADEQ 45 days before beginning final closure. Final closure will be supervised and certified by an independent registered professional engineer in Arizona. Within 60 days of completion of closure activities, a certificate of closure will be submitted to ADEQ (40 CFR 264.115).

H.2.5 Survey

A professional land surveyor licensed in the State of Arizona will prepare and certify a survey of the MTR. The purpose of the survey is to document sample locations and closure facilities, along with site boundaries and any other pertinent details. All salient field locations (e.g., sample locations and treatment facilities) will be surveyed to a permanent United States Geological

Survey (USGS) benchmark. All survey data will be included in the closure certification.

H.3 Notification of Closure and Notice to Local Land Authority

The location of closed OD sites will be noted on MCAS Yuma real estate property records. Because of the clean closure, post-closure uses of the land are not restricted. Notification will also be provided to appropriate State agencies.

Exhibit H-1

Sampling and Analysis Plan for Closure

DRAFT

Sampling and Analysis Plan

Closure
Munitions Treatment Range
Marine Corps Air Station
Yuma, Arizona

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Prepared for:

United States Department of the Navy
Naval Facilities Engineering Systems Command Southwest
750 Pacific Highway
San Diego, CA 92132

Prepared by:

Liberty JV
1851 W. 24th Street
Yuma, AZ 85364-6104

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Plan Prepared By:	Eric Gardner, Liberty JV PM	2/28/25 Date
Plan Approved By:	Jesse MacNeill, Liberty JV QA Coordinator	2/28/25 Date
Plan Approved By:	Mark Galate, MCAS Yuma	2/27/2025 Date

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Acronyms and Abbreviations

˚C ..... degrees Celsius
µg/kg ..... micrograms per kilogram
µg/L ..... micrograms per liter
mg/kg ..... milligrams per kilogram
mg/L ..... milligrams per liter
mL/min ..... milliliters per minute

ADEQ ..... Arizona Department of Environmental Quality

bgs ..... below ground surface
BMGR ..... Barry M. Goldwater Range

COC ..... chain of custody

DOD ..... United States Department of Defense
DON ..... United States Department of the Navy
DPT ..... direct push technology
DQO ..... data quality objective

EB ..... equipment blank
ELAP ..... Environmental Laboratory Accreditation Program

FB ..... field blank
FTL ..... field team leader

GPL ..... groundwater protection level

HAZWOPER ..... Hazardous Waste Operations and Emergency Response

IDW ..... investigation-derived waste

Liberty JV ..... Liberty Joint Venture

MCL ..... maximum contaminant level
MCAS ..... Marine Corps Air Station
MS ..... matrix spike
MSD ..... matrix spike duplicate
MTR ..... Munitions Treatment Range

NAVFAC ..... Naval Facilities Engineering Systems Command
NAVFAC SW ..... Naval Facilities Engineering Systems Command Southwest

OSHA ..... Occupational Safety and Health Administration

PM ..... Project Manager
PSL ..... project screening limit

QA ..... quality assurance
QC ..... quality control
QSM ..... Quality Systems Manual

RCRA ..... Resource Conservation & Recovery Act
rSRL ..... residential soil remediation level

SAP ..... Sampling and Analysis Plan
SOP ..... standard operating procedure
SOW ..... scope of work
SRL ..... soil remediation level
SSHO ..... Site Health & Safety Officer
SSHP ..... Site Health and Safety Plan
SVOC ..... semi-volatile organic compound

TO ..... task order
TPH ..... total petroleum hydrocarbon

USEPA ..... United States Environmental Protection Agency

VOC ..... volatile organic compound

Executive Summary

This Sampling and Analysis Plan (SAP) describes the rationale, scope of work (SOW), procedures, and methodologies to be employed during the collection and analysis of samples from active shotholes, pits of fragmentation, and White Phosphorus detonation areas for the future closure of the Munitions Treatment Range (MTR) at Marine Corps Air Station (MCAS) Yuma. This SAP will be utilized for site closure sampling. The MTR is illustrated in Figure 1 and Figure 2.

The closure process will include pre-closure sampling, analysis, and further investigation and/or remedial activities, if necessary. The purpose of this SAP is to present a pre-closure sampling strategy, including a field sampling methodology and the quality assurance/quality control (QA/QC) protocols that will be implemented throughout the project. The objective of the sampling event is to characterize the environmental condition upon cessation of MTR open detonation activities and evaluate the need for further investigation and/or remediation before closure. The objective will be accomplished by collecting surface and subsurface soil and rinse water samples for the Class A and B and White Phosphorus detonation areas.

All samples will be analyzed at an Environmental Laboratory Accreditation Program (ELAP)-certified fixed-base laboratory for the following:

- Explosives, EPA Method 8330;
- Perchlorate, EPA Method 6850;
- White Phosphorus, EPA Method 7580;
- Metals, EPA Methods 6010B and 7471;
- Semi-volatile organic compounds (SVOCs), EPA Method 8270; and
- Volatile organic compounds (VOCs), EPA Method 8260.

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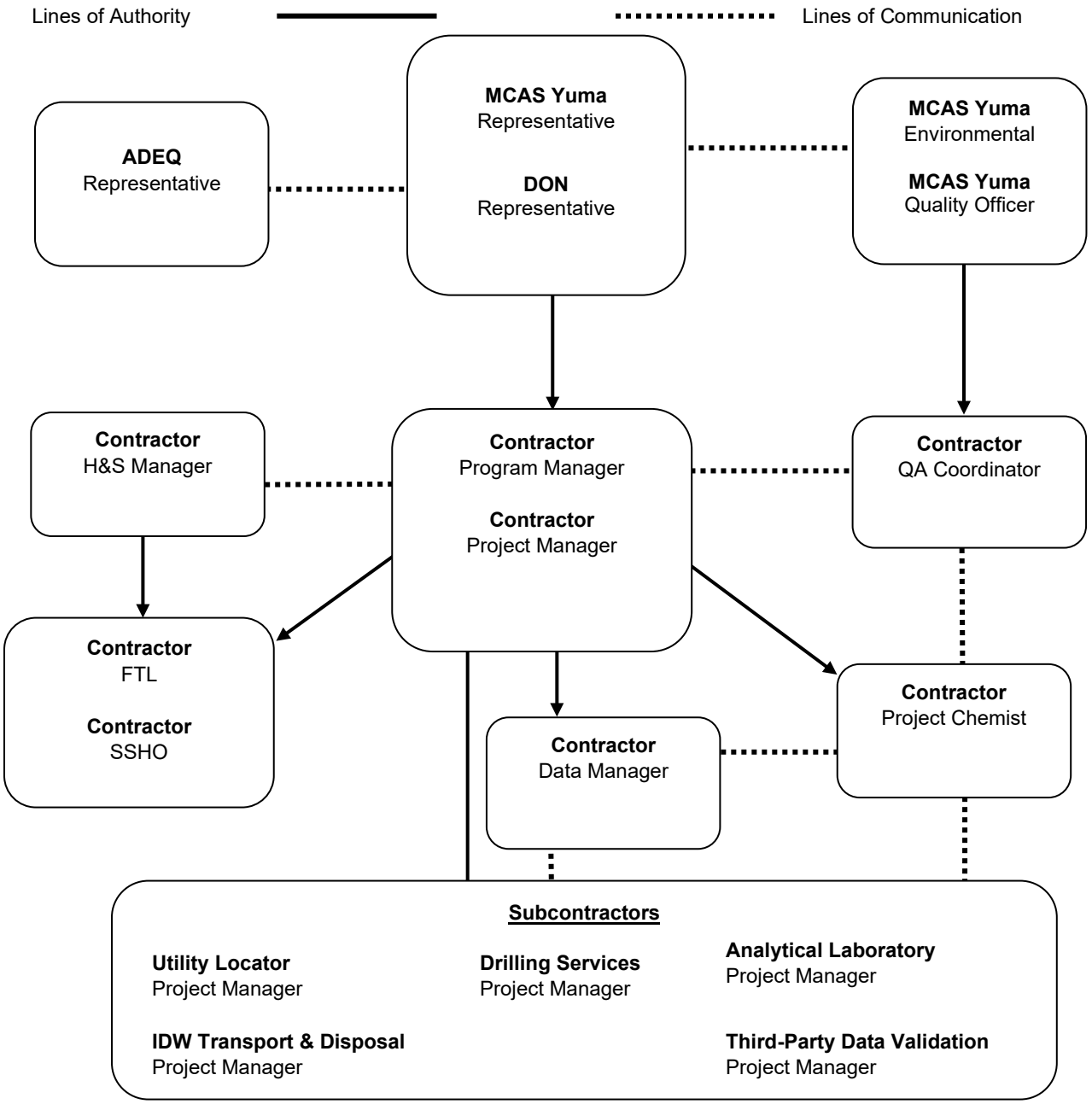
1.0 Responsibilities and Lines of Authority

Project Organizational Chart



ADEQ = Arizona Department of Environmental Quality; DON = Department of the Navy; FTL = Field Team Leader; H&S = Health and Safety; IDW = investigation-derived waste; JV = Joint Venture; MCAS = Marine Corps Air Station; QC = quality control; SSHO = Site Safety & Health Officer

1.1 Project Stakeholders

- MCAS Yuma – Lead Agency/Permit Holder
- Department of the Navy (DON) – Contract Execution and Management
- Arizona Department of Environmental Quality (ADEQ) - Lead Regulatory Agency

1.2 Project Manager (PM)

The PM is the primary point of contact for the project team and stakeholders. They are responsible for comprehensive oversight and final decision-making for the project. The PM coordinates work activities and subcontractor personnel, ensuring that field activities are performed in accordance with the SAP. They promote a safe work environment for all project personnel by applying work guidelines specified in the Site Health and Safety Plan (SSHP) and all applicable Occupational Safety and Health Administration (OSHA) regulations. Additionally, the PM serves as a technical resource to the project team and stakeholders.

1.3 Field Team Leader (FTL)

The FTL directs site activities following the approved SAP and Federal, state, and applicable local laws and regulations. The FTL provides direction to the field staff and subcontractors and has the responsibility and authority to halt or modify any working conditions and remove any person who refuses to comply with the site plans or whose behavior endangers their safety or the safety of others. The FTL may also have collateral duties, such as the SSHO.

1.4 Quality Assurance Coordinator

The Quality Assurance Coordinator ensures the project-specific SAP conforms to current NAVFAC requirements. They review and approve the SAP, communicate with the PM, and notify them of any deviations from the SAP and nonconformance issues. Additionally, they coordinate field and laboratory QA, oversee field QA and project QA compliance, and hold the authority to suspend project activities if QA requirements are not met.

1.5 Site Safety and Health Officer (SSHO)

The SSHO will provide day-to-day support, conduct tailgate safety meetings, verify training and medical clearances of on-site personnel, and report activities to the PM. The SSHO is the primary contact in any on-site emergency. The SSHO is responsible for facilitating and coordinating the field implementation of the SSHP and has the responsibility and authority to halt or modify hazardous activities or working conditions.

2.0 Project Technical Design

2.1 Project Description / Background

Marine Corps Air Station (MCAS) Yuma is located in the City of Yuma in the southwestern corner of Arizona. This permit also includes the Barry M. Goldwater Range (BMGR), a 2.8-million-acre area divided into two segments; the eastern two-thirds is designated the Gila Bend segment (approximately 1.6 million acres), and the western third is designated the Yuma segment. The Yuma segment occupies approximately 760,000 acres and is operated by MCAS Yuma. MCAS Yuma operates four sub-ranges in the BMGR: two manned ranges, an air-to-air gunnery range, and an air combat maneuvering range. These sub-ranges have been important MCAS Yuma facilities for training pilots in aerial and air-to-ground combat since 1941.

The Munitions Treatment Range (MTR), a 1000-meter square area located on the far western boundary of the Yuma segment of the BMGR, is regulated under RCRA. The MTR facility is used to treat ordnance stockpiled at MCAS Yuma as well as ordnance and explosive end items from other military bases and bombing ranges, from local government-owned manufacturing facilities, and local manufacturers under contract to the United States government located in Arizona and California.

The MTR was formerly used for open burning and open detonation. The two former open burn trenches were clean-closed in accordance with federal and State of Arizona regulations and requirements in October 1998. The MTR is used for open detonation activities, including fragment, non-fragment, and white phosphorus. There are currently two main detonation areas: the Class A and B Detonation Area and the White Phosphorus Detonation Area. Both detonation areas are located in the central portion of the MTR.

2.2 Data Quality Objectives (DQOs)

The purpose of the pre-closure activities is to evaluate the potential for soil contamination due to munitions treatment at the MTR. The goal is the characterization of the soil at the Class A and B Detonation Area and White Phosphorus Detonation Area for the contaminants of concern.

The Decision Rules for this investigation are based upon a comparison of laboratory analytical results to State of Arizona residential soil remediation levels (rSRL) or groundwater protection levels (GPL) established by ADEQ (Section 10.0).

The principal Decision Rules for this sampling event are:

a) **If** the concentrations of hazardous substances in the active shotholes/pits exceed the residential SRLs or GPLs, **then** MCAS Yuma will excavate and dispose of the contaminated soil and also collect confirmatory soil samples to evaluate whether the residual soil samples are below the residential SRLs and/or GPLs.

b) **If** the concentrations of hazardous substances in the soil samples collected from the active shotholes/pits do not exceed the residential SRLs and GPLs, **then** no further action will be necessary.

2.3 Sampling Points

Up to five soil borings will be installed at active shothole(s)/pit(s) of a detonation area using direct push technology (DPT) to a depth of 10 feet below ground surface (bgs). Up to three soil samples will be collected from each boring (up to 15 total samples) from depths of approximately 0-1.5 feet bgs, 4.5-6 feet bgs, and 8.5-10 feet bgs (Figure 2).

2.4 Sample Method

The DPT rig with a 2-inch-diameter sampling tube lined with acetate sleeves will collect the subsurface soil samples as the boring advances. Grab soil samples will be collected from the acetate sleeve. Subsurface soil sampling will be conducted in accordance with the procedures described in this SAP and standard operating procedure (SOP) SOP 07 *Subsurface Soil Sampling* (Attachment 1). Soil samples will be logged in accordance with ASTM Method D2487 *Standard Practice for Clarification of Soils for Engineering Purposes*.

2.5 Analytical Methods

Subsurface soil samples collected from the MTR will be analyzed for the following:

- Explosives by EPA Method 8330,
- Perchlorate by EPA Method 6850,
- White Phosphorus by EPA Method 7580,
- Metals by EPA Methods 6020B/7471A,
- SVOCs by EPA Method 8270, and
- VOCs by EPA Method 8260D

All samples will be sent to a laboratory certified by the United States Department of Defense (DoD) ELAP and the State of Arizona. Analyses will comply with the DoD Quality Systems Manual (QSM) Version 5.4 (DoD, 2021).

2.6 Quality Control (QC) Activities

QC samples will be collected at a frequency designated in Section 4.0. QC samples will include matrix spikes (MS) and matrix spike duplicates (MSD), equipment blanks (EB), and field blanks (FB). If reusable sampling equipment is used, an EB will be collected from decontaminated sampling equipment. Analytical methods will include performing initial calibrations, continuing calibration, tuning, laboratory blanks, replicates, laboratory control spikes, and other applicable QC as defined by *DoD QSM Version 5.4* (DoD, 2021).

Field duplicates will not be collected for soil samples. Due to the heterogeneity of the soil matrix, soil duplicates are inherently more variable than aqueous duplicates, and quantifying the variability is not necessary to support the project DQOs because sample variability from a specific sampling location is expected to have minimal impact on the identification of locations requiring additional characterization.

Field blanks will be collected using the same deionized water source used to decontaminate the sampling equipment in the field. The field blank will be shipped back to the laboratory and analyzed with the remaining samples.

Samples will be collected, managed, and shipped to the selected laboratory in accordance with the guidelines presented in SOP 01 *Sample Custody* and SOP 02 *Packaging and Shipping Environmental Samples* (Attachment 1).

3.0 Special Training Requirements

As specified in the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements (Title 29 CFR 1910.120), routine training applies to those conducting fieldwork. The regulation states that all personnel involved in the characterization or remediation of an uncontrolled hazardous waste site must have 40 hours of certified training and three days of supervised field experience. In compliance with Title 29 CFR 1910.120, “general site workers,” those individuals performing field activities such as collecting media samples, will have completed the appropriate OSHA HAZWOPER training course.

Personnel on-site for occasional inspection and sampling activities are unlikely to experience exposure over the permissible and published exposure limits. They may be considered “workers on site only occasionally for a specific limited task.” These workers must have 24 hours of training and one day of field experience. Employees with minimal (low risk) exposure or low probability of exposure to hazardous substances are covered by other OSHA standards, such as the Hazard Communication Standard, Title 29 CFR 1910.120.

All site workers will be 40-hour trained and meet the minimum standard for supervised field experience. In compliance with regulatory procedures related to training, at least one supervisor, having received the OSHA 8-hr Hazardous Waste Supervisor training, will be on-site at all times. All employees must have been trained in first aid and cardiopulmonary resuscitation (CPR). At least one employee, properly trained and certified in adult first aid and CPR, will be assigned and on-site at all times work is being performed.

4.0 Field Sampling Tables

Sampling Containers and Preservation Requirements:

Matrix	Analyte	Sample Volume	Container	Preservation	Holding Time (Prep/Analysis)
Soil	Explosives	30-g	4-oz Glass Jar	4 ± 2°C	14 days / 40 days
	Perchlorate	10-g	4-oz Glass Jar	4 ± 2°C	28 days
	White Phosphorus	40-g	8-oz Amber Glass	4 ± 2°C	30 days to analysis
	Metals	2-g	4-oz Glass Jar	4 ± 2°C	180 days
	VOCs	(3) 5-g	(3) 5-g Terra Core Samplers	4 ± 2°C	14 days
	SVOCs	30-g	4-oz Glass Jar	4 ± 2°C	14 days / 40 days

Notes:

ºC = degrees Celsius; g = gram; oz = ounce; SVOC = semi-volatile organic compound; VOC = volatile organic compound

Field Quality Control Sample Summary

Matrix	Analytical Group	Number of Samples[1]	Number of MS/MSDs (5%[2])	Field Blanks	Trip Blanks[3]	Equip. Blanks	Temperature Blanks	Total Number of Samples to Lab
Soil	Explosives	15	1/1	1	0	1	One per cooler	19
	Perchlorate	15	1/1	1	0	1		19
	White Phosphorus	15	1/1	1	0	1		19
	Metals	15	1/1	1	0	1		19
	VOCs	15	1/1	1	1	1		20
	SVOCs	15	1/1	1	0	1		19

Notes:
[1] The number of samples assumes 1 day of field sampling activities.
[2] 1 MS/MSD sample for every 20 samples collected.
[3] One per ice chest containing VOC samples.

MS/MSD = matrix spike/matrix spike duplicate; SVOC = semi-volatile organic compound; VOC = volatile organic compound

5.0 Field Procedures

All project-specific tasks and procedures will be performed in accordance with the following field SOPs (Attachment 1).

- SOP 01 – Sample Custody
- SOP 02 – Packaging and Shipping Environmental Samples
- SOP 03 – Field Logbook Content and Control
- SOP 04 – Field Sample Numbering
- SOP 05 – Drilling
- SOP 06 – Lithologic Logging
- SOP 07 – Subsurface Soil Sampling
- SOP 10 – Decontamination of Field Equipment

6.0 Sample Handling and Custody Requirements

To provide a method of tracking each sample through collection, analysis, data review, and data reduction, a sample identification (ID) system has been established for the MTR sampling activities. Sample IDs will be assigned in the field according to the following system:

- A designation of the month, year, and site name followed by a hyphen.
- A designation for the sample location and sample number followed by a hyphen.
- A designation for the sample number followed by a hyphen.
- A designation for the sample type (i.e., primary [1]).

An example of the sample ID is:

0325MTR-FG1-0.0-01-1

Example: Date: 0325 (March 2025)+MTR, Sample location (FG – Fragmentation Detonation Area, WP – White Phosphorus Detonation Area), Sample/Number (1), Depth (0.0’), First Sample Collected (01), Primary Sample (1)

[Sample Types: 1 = primary, 2 = duplicate, 3 = MS/MSD, 4 = equipment blank, 5 = trip blank, 6 = field blank]

Field QC samples subjected to chemical analysis, such as EBs, FBs, and trip blanks (TB), will also be named sequentially numbered as collected in the field with site characterization samples. Field QC samples will be submitted to the laboratory under blind identification. Field QC samples will not be identified as QC samples in the sample name or on the Chain of Custody (COC).

In the following hypothetical example, the first samples collected at the site are from the Fragmentation Detonation Area (FG).

- A soil sample is collected.
- An EB sample is collected.
- Following the sampling, an FB is collected.

In accordance with the protocol described above, the samples would be named as follows:

- The soil sample: **0325MTR-FG1-0.0-01-1**
- The EB sample: **0325MTR-FG1-0.0-02-4**
- The FB sample: **0325MTR-FG1-0.0-03-6**

Each sample collected will be labeled with the unique sample ID, date and time the sample was collected, preservation used, the sampler's initials, and the analysis to be performed. Each sample will then be logged onto a COC form for delivery to the laboratory. All samples will be sent to the laboratory via overnight courier delivery (i.e., FedEx). Temperature blanks will be labeled as temperature blanks. Temperature blanks are not subject to chemical analysis.

The field logbook will document cross-reference information regarding the assigned sample identification number and whether the sample is a field quality control sample. These logbooks will be maintained in the project file.

7.0 Field Instrument, Equipment, and Supplies (Testing and Maintenance Requirements)

Field Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Photoionization Detector (PID)	Calibration	Daily	Calibrate to known standards	Return to manufacturer for repair; Replace with rental unit	Field Team Lead	Manufacturer User Manual

Notes:

Rental equipment and instruments are frequently used in the field. The rental firms will be responsible for the proper care, maintenance, and repair of these items, and for tracking and documenting equipment and instrument maintenance and repairs.

8.0 Field Implementation (Field Instructions)

This section presents the field activities during soil sampling at the MTR.

8.1 Field Tasks

Field activities include the following:

- DPT drilling/soil sampling
- Equipment decontamination
- Remediation-derived waste management

8.1.1 Pre-Field Activities

Prior to the initiation of fieldwork, site reconnaissance and preparation will be performed to understand where key features are located. Reconnaissance will include verifying the hospital location, identifying access points to restricted areas, the soil boring locations, base support facilities, and other key features. Preparation will involve setting up equipment and the work area (e.g., laydown, decontamination) as appropriate.

8.1.2 DPT Drilling/Soil Sampling

Five soil borings will be completed using a DPT drill rig to a maximum depth of up to 10 feet bgs. The DPT rig with a 2-inch-diameter sampling tube lined with acetate sleeves will collect the subsurface soil samples as the boring advances.

Three subsurface soil samples per boring (up to 15 samples) will be collected as follows:

- The first sample interval will be at a depth of approximately 0-1.5 feet bgs.
- The second sample interval will be at a depth of approximately 4.5-6.0 feet bgs.
- The third sample interval will be at a depth of approximately 8.5-10 feet bgs.

Subsurface soil sampling will be conducted in accordance with the procedures described in this SAP and SOP 07 *Subsurface Soil Sampling* (Attachment 1). Soil samples will be logged following ASTM Method D2487 *Standard Practice for Clarification of Soils for Engineering Purposes*.

Subsurface soil samples will be collected from three sample intervals by DPT. A 2-inch DPT macrocorer will be advanced to the sampling target depth, the core will be retrieved and sliced open, and a geologist will document lithology.

Subsurface soil sampling procedures for soil sample collection using DPT are as follows:

1. When collecting or handling soil samples, wear disposable nitrile gloves to prevent cross-contamination and provide personal protection. New gloves will be donned for sample collection at each sampling location or interval or whenever gloves are torn or otherwise compromised.
2. Between each sampling location and prior to each sampling run, the sampler, sleeves, and other nondisposable sampling equipment will be decontaminated as described in SOP 10 *Decontamination of Field Equipment* (Attachment 1).
3. The probe rods equipped with a solid drive tip will be advanced to the desired depth or target horizon where the sampling run begins. Additional probe rods will be added to reach the specified sampling depth. After reaching the target depth, the center rods and drive tip will be removed, and a new acetate liner will be attached to the center rod string.
4. The DPT contractor will remove the liner and present it to the field geologist/engineer for inspection and sample collection. Upon receiving the liner, the field geologist/engineer will observe and record the amount of sample recovery and any associated problems. The field geologist/engineer will cut the sample at the desired interval.
5. The boring log will document any observed field problems associated with the sampling attempt (e.g., refusal) or lack of recovery.
6. A depth discrete soil sample will be collected, and the soil will be transferred directly from the liner to the sample container.
7. Record the location/depth of each subsurface soil sample on the soil/boring log.
8. Soil sample selection will be based on four factors: (1) judgment that the sample represents relatively undisturbed intact material, not slough; (2) proximity to the drive shoe; (3) lithology; and (4) obvious evidence of contamination. The soil core will also be visually recorded on a boring log.

Each soil sample will be labeled appropriately and numbered to be submitted for analysis in accordance with the procedures in Section 6.0. Soil samples will be sent to a laboratory certified by the DoD and State of Arizona ELAP for analyses listed in Section 10.0.

8.2 Equipment Decontamination

All sampling equipment and larger equipment (e.g., drill rig and downhole equipment) will be thoroughly decontaminated before initiating any site work in accordance with SOP 10 *Decontamination of Field Equipment* (Attachment 1). Larger equipment decontamination will be performed using potable water followed by a deionized water rinse. All reusable sampling equipment and large equipment will be decontaminated before use at each sampling location to minimize the potential for contaminant migration or cross-contamination. Equipment decontamination areas will be located within or adjacent to the

fieldwork area, as designated by supervising field personnel.

Sampling equipment decontamination will be conducted as follows:

1. Potable water and nonphosphate detergent (i.e., Liquinox™) wash (using brushes or a steam cleaner, as appropriate),
2. Potable water rinse,
3. Distilled or deionized water rinse,
4. Equipment air-dried and stored until used.

The effectiveness of the decontamination procedures will be tested by collecting one equipment blank per day for sampling equipment.

Reusable personal protective equipment shall be inspected for indications of defects and contamination. If indications of contamination are detected on these materials, they will be decontaminated so they can be reused. If defects are identified, reusable personal protective equipment will be disposed of as municipal waste.

Disposable chemical-resistant gloves (i.e., nitrile gloves) will be placed in plastic trash bags and disposed of as municipal waste. Field personnel should wash their hands and shower after leaving the site.

8.3 Remediation-Derived Waste Management

The following waste streams are anticipated to be generated during drilling and soil sampling activities:

- Personal protective equipment and general debris
- Equipment decontamination wastewater

Liquids produced by this project will be containerized and stored in Department of Transportation-approved drums. Drummed liquid waste will be stored temporarily on double containment pallets or within a liquid waste containment area. Nonhazardous solid waste will be disposed of as municipal waste or, if possible, recycled. Nonhazardous personal protective equipment, general debris, and decontaminated waste materials will be disposed of at the end of each day and will not be accumulated.

Waste disposal will be determined based on the analytical results of the media in question. Contaminated waste will be transported to an authorized disposal facility following local, state, and federal regulations.

8.4 Field Quality Control Sampling

QA is an integrated system of activities in quality planning, assessment, and improvement to provide the project with a measurable assurance that the established standards of quality are met. QC checks, including field and laboratory, are specific operational techniques and activities to fulfill the QA requirements.

Field QC samples for each sampling event will include an equipment blank, trip blank, and field blank. Although technically considered laboratory QC samples, matrix spike (MS) and matrix spike duplicate (MSD) samples will also be collected in the field. QC samples will be collected at the frequencies described in Section 4.0.

8.4.1 Equipment Blank

An equipment blank (EB) will be collected at a rate of one per day when nondisposable field sampling equipment is decontaminated. EBs are samples of DI water exposed to the surface of non-dedicated decontaminated sampling equipment. The EB is collected during the final rinse of the sampling equipment after decontamination procedures are performed. EBs are analyzed for the same parameters as field samples to evaluate the effectiveness of field decontamination procedures.

8.4.2 Trip Blank

Each cooler containing VOC samples shipped to the laboratory will include a trip blank. Trip blanks are used when the collection of VOC samples is required and serve to detect and identify any VOC contaminant in the samples while traveling to the lab. This blank represents the “trip” the volatile vials take from leaving the laboratory with the bottle order to the field for sample collection and back to the lab for testing. The laboratory creates trip blanks by filling volatile vial containers with laboratory-grade DI water and sealing the container. The laboratory will provide trip blanks, which will not be opened until they return to the lab for testing.

8.4.3 Field blank

One field blank will be collected and analyzed per sampling event per each water source. Field blanks are analyzed to assess contamination introduced during field sampling procedures and sample shipment. Field blanks, consisting of samples of the source water used, will be analyzed to evaluate whether the wash or rinse water contained contaminants that may have been carried over into the samples.

8.4.4 Matrix Spike Samples

MS and MSD samples are designed to check the precision and accuracy of the analytical methods through the analysis of a field sample with a known amount of analyte added (spiked). The additional sample volume of MS and MSD samples is collected in the field in the same manner as field samples. In the laboratory, two portions of the sample are spiked with a standard solution of target analytes. MS and MSD samples are analyzed for the same parameters as the field samples, and analytical results will be evaluated for the precision and accuracy of the laboratory process and the effects of the sample matrix. MS/MSD samples are collected at one per 20 field samples.

8.5 Field Documentation

All field data will be recorded in ink on the forms listed below. The Field Team Lead or designee will review field data and records. Instrument selections and use, including calibration and standardization, field deviations, and sampling limitations, will be recorded on the daily field log. A bound field logbook may be used instead of the daily field log to document daily field activities.

The reviewer will initialize field records before they are incorporated into reports or used in program decisions. Changes or corrections to field form entries will be completed by striking out the incorrect entry with a single line, initialing (by the person correcting), and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information should be written clearly above the crossed-out item.

Daily activities will be recorded using the following field documentation:

- Field logbook/field forms
- Boring log
- Sample collection log
- Chain-of-custody form

Field logbooks, field forms, chain-of-custody forms, correspondence, and project reports will be maintained in electronic format at the completion of the project.

8.6 Field SOPs Reference Table

SOP Number	Title	Revision Date	Location of SOP	Deviations for Project Work	Comments
SOP 01	Sample Custody	9/20/2021	Attachment 1	None	None
SOP 02	Packaging and Shipping Environmental Samples	9/20/2021		None	None
SOP 03	Field Logbook Content and Control	9/20/2021		None	None
SOP 04	Field Sample Numbering	9/20/2021		None	None
SOP 05	Drilling	9/20/2021		None	None
SOP 06	Lithologic Logging	9/20/2021		None	None
SOP 07	Subsurface Soil Sampling	9/20/2021		None	None
SOP 10	Decontamination of Field Equipment	9/20/2021		None	None

Notes:
Copies of field SOPs are provided in Attachment 1.

SOP = standard operating procedure

8.7 Sample Details Table

Sampling Location	Matrix	Depth (feet bgs)	Analytical Groups	Number of Samples
Soil Boring 1	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10	Explosives Perchlorate White Phosphorus Metals SVOCs VOCs	3
Soil Boring 2	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 3	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 4	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 5	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 6	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 7	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 8	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 9	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 10	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 11	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3

Sampling Location	Matrix	Depth (feet bgs)	Analytical Groups	Number of Samples
Soil Boring 12	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10	Explosives Perchlorate White Phosphorus Metals VOCs SVOCs	3
Soil Boring 13	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 13	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3
Soil Boring 15	Soil	0 – 1.5 4.5 – 6.0 8.5 - 10		3

Notes:
bgs = below ground surface; SVOC = semi-volatile organic compound; VOC = volatile organic compound

9.0 Reference Limits and Screening Criteria

Matrix: Soil
Analytical Group: Explosives
Analytical Method: USEPA Method 8330

Analyte	CAS Number	Project Screening Criteria (mg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory Limits	
					RL (mg/kg)	MDL (mg/kg)
HMX	2691-41-0	3,100	rSRL	0.4	0.4	0.1
RDX	121-82-4	5	rSRL	0.4	0.4	0.1
1,3,5-TNB	99-35-4	1,800	rSRL	0.4	0.4	0.1
1,3-DNB	99-65-0	6.1	rSRL	0.4	0.4	0.1
2,4-DNT	121-14-2	120	rSRL	0.4	0.4	0.1
2,6-DNT	606-20-2	61	rSRL	0.4	0.4	0.1
2,4,6-TNT	118-96-7	18	rSRL	0.4	0.4	0.1
2-AM-4,6-DNT	35572-78-2	NE	NA	0.4	0.4	0.1
2-Nitrotoluene	88-72-2	NE	NA	0.4	0.4	0.1
3-Nitrotoluene	99-08-1	NE	NA	0.4	0.4	0.1
4-AM-2,6-DNT	19406-51-0	NE	NA	0.4	0.4	0.1
4-Nitrotoluene	99-99-0	NE	NA	0.4	0.4	0.1
Tetryl	479-45-8	NE	NA	0.4	0.4	0.1
Nitrobenzene	98-95-3	20	rSRL	0.4	0.4	0.1

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.

mg/kg = milligram per kilogram; DNB = dinitrobenzene; DNT = dinitrotoluene; HMX = octogen; MDL = method detection limit; NA = not applicable; NE = not established; RDX = hexogen; RL = reporting limit; rSRL = residential soil remediation level; TNB = trinitrobenzene; TNT = trinitrotoluene

Matrix: Soil
Analytical Group: Perchlorate
Analytical Method: USEPA Method 6850

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Perchlorate	14797-73-0	55,000	rSRL	4	4	1

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/kg = microgram per kilogram; MDL = method detection limit; RL = reporting limit; rSRL = residential soil remediation level

Matrix: Soil
Analytical Group: White Phosphorus
Analytical Method: USEPA Method 7580

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
White Phosphorus	7723-14-0	1,600	rSRL	1	1	0.24

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/kg = microgram per kilogram; MDL = method detection limit; RL = reporting limit; rSRL = residential soil

Matrix: Soil
Analytical Group: Metals
Analytical Method: USEPA Method 6020B/7471A

Analyte	CAS Number	Project Screening Criteria (mg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory Limits	
					RL (mg/kg)	MDL (mg/kg)
Arsenic	7440-38-2	10	rSRL	1	0.5	0.1
Barium	7440-39-3	15,000	rSRL	1	0.5	0.1
Cadmium	7440-43-9	29	GPL	1	0.5	0.1
Chromium	7440-47-3	30	rSRL	1	0.5	0.1
Lead	7439-92-1	290	GPL	1	0.5	0.1
Mercury	7439-97-6	12	GPL	1	0.1	0.02
Selenium	7782-49-2	290	GPL	1	0.5	0.1
Silver	7440-22-4	390	rSRL	1	0.5	0.1

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
mg/kg = milligram per kilogram; GPL = groundwater protection level; MDL = method detection limit; RL = reporting limit; rSRL = residential soil remediation level

Matrix: Soil
Analytical Group: VOCs
Analytical Method: USEPA Method 8260D

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					LOD (µg/kg)	DL (µg/kg)
Acetone	67-64-1	14,000,000	rSRL	10	10	5
Benzene	71-43-2	650	rSRL	5	5	1
Bromobenzene	108-86-1	28,000	rSRL	5	5	1
Bromochloromethane	74-97-5	NE	NA	5	5	1
Bromodichloromethane	75-27-4	830	rSRL	5	5	1
Bromoform	75-25-2	69,000	rSRL	5	5	2
Bromomethane	74-83-9	3,900	rSRL	10	10	2
2-Butanone (MEK)	78-93-3	23,000,000	rSRL	10	10	5
n-Butylbenzene	104-51-8	41,000	GPL	5	5	1
sec-Butylbenzene	135-98-8	39,000	GPL	5	5	1
tert-Butylbenzene	98-06-6	69,000	GPL	5	5	1
Carbon disulfide	75-15-0	122,000	GPL	5	5	1
Carbon tetrachloride	56-23-5	250	rSRL	5	5	1
Chlorobenzene	108-90-7	150,000	rSRL	5	5	1
Chloroethane	75-00-3	3,000	rSRL	5	5	2
Chloroform	67-66-3	940	rSRL	5	5	1
Chloromethane	74-87-3	48,000	rSRL	5	5	2
2-Chlorotoluene	95-49-8	NE	NA	5	5	1
4-Chlorotoluene	106-43-4	NE	NA	5	5	1
Dibromochloromethane	124-48-1	1,100	rSRL	5	5	1
1,2-Dibromo-3-chloropropane	96-12-8	530	rSRL	5	5	2
1,2-Dibromoethane	106-93-4	29	rSRL	5	5	1
Dibromoethane	74-95-3	NE	NA	5	5	1
1,1-Dichloroethane	75-34-3	510,000	rSRL	5	5	1
1,2-Dichloroethane	107-06-2	230	GPL	5	5	1
1,2-Dichlorobenzene	95-50-1	600,000	rSRL	5	5	1
1,3-Dichlorobenzene	541-73-1	530,000	rSRL	5	5	1
1,4-Dichlorobenzene	106-46-7	3,500	rSRL	5	5	1

VOCs by 8260D / Soil - Continued

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Dichlorodifluoromethane	75-71-8	94,000	rSRL	5	5	2
1,1-Dichloroethene	75-35-4	120,000	NA	5	5	1
cis-1,2-Dichloroethene	156-59-2	43,000	NA	5	5	1
trans-1,2-Dichloroethene	156-60-5	69,000	NA	5	5	1
1,1-Dichloropropene	563-58-6	NE	NA	5	5	1
1,2-Dichloropropane	78-87-5	340	NA	5	5	1
1,3-Dichloropropane	142-28-9	100,000	NA	5	5	1
2,2-Dichloropropane	594-20-7	NE	NA	5	5	2
cis-1,3-Dichloropropene	10061-01-5	NE	NA	5	5	1
trans-1,3-Dichloropropene	10061-02-6	NE	NA	5	5	1
Ethylbenzene	100-41-4	82,000	GPL	5	5	1
2-Hexanone (MBK)	591-78-6	NE	NA	10	10	5
Hexachlorobutadiene	87-68-3	7,000	rSRL	5	5	2
Isopropylbenzene	98-82-8	92,000	rSRL	5	5	2
p-Isopropyltoluene	99-87-6	NE	NA	5	5	1
Methylene Chloride	75-09-2	9,300	rSRL	10	10	2
4-Methyl-2-pentanone(MIBK)	108-10-1	5,300,000	rSRL	10	10	5
tert-Butyl methyl ether	1634-04-4	32,000	rSRL	5	5	1
Naphthalene	91-20-3	4,000	GPL	10	10	2
n-Propylbenzene	103-65-1	41,000	GPL	5	5	1
Styrene	100-42-5	1,500,000	rSRL	5	5	1
1,1,1,2-Tetrachloroethane	630-20-6	3,200	rSRL	5	5	1
1,1,2,2-Tetrachloroethane	79-34-5	420	rSRL	5	5	1
Tetrachloroethene	127-18-4	510	NA	5	5	1
Toluene	108-88-3	159,000	GPL	5	5	1
1,1,1-Trichloroethane	71-55-6	1,200,000	rSRL	5	5	1
1,1,2-Trichloroethane	79-00-5	740	rSRL	5	5	1
1,2,3-Trichlorobenzene	87-61-6	NE	NA	5	5	2

VOCs by 8260D / Soil - Continued

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
1,2,4-Trichlorobenzene	120-82-1	62,000	rSRL	5	5	2
Trichloroethene	79-01-6	3,000	NA	5	5	1
Trichlorofluoromethane	75-69-4	390,000	rSRL	5	5	2
1,2,3-Trichloropropane	96-18-4	5	rSRL	5	5	2
1,2,4-Trimethylbenzene	95-63-6	26,000	GPL	5	5	2
1,3,5-Trimethylbenzene	108-67-8	6,000	GPL	5	5	2
Vinyl Chloride	75-01-4	85	rSRL	5	5	2
Xylenes	1330-20-7	270,000	rSRL	10	10	2

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/kg = microgram per kilogram; GPL = groundwater protection level; MDL = method detection limit; NA = not applicable; NE = not established; RL = reporting limit; rSRL = residential soil remediation level; VOC = volatile organic compound

Matrix: Soil
Analytical Group: SVOCs
Analytical Method: USEPA Method 8270

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Acenaphthene	83-32-9	21,000	GPL	333	333	167
Acenaphthylene	208-96-8	NE	NA	333	333	167
Anthracene	120-12-7	1,000	GPL	333	333	167
Azobenzene	103-33-3	5,000	rSRL	333	333	167
Benzo(a)anthracene	56-55-3	690	rSRL	333	333	167
Benzo(a)pyrene	50-32-8	69	rSRL	333	333	167
Benzo(b)fluoranthene	205-99-2	690	rSRL	333	333	167
Benzo(g,h,i)perylene	191-24-2	NE	NA	333	333	167
Benzo(k)fluoranthene	207-08-9	6,900	rSRL	333	333	167
Benzyl Alcohol	100-51-6	18,000,000	rSRL	333	333	167
Bis(2-chloroethoxy)methane	111-91-1	NE	NA	333	333	167
Bis(2-chloroethyl)ether	111-44-4	230	rSRL	333	333	167

SVOCs by 8270 / Soil - Continued

Analyte	CAS Number	Project Screening Criteria[1] (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Bis(2-chloroisopropyl)ether	108-60-1	790,000	rSRL	333	333	167
Bis(2-Ethylhexyl)phthalate	117-81-7	39,000	rSRL	333	333	167
4-Bromophenyl-phenylether	101-55-3	NE	NA	333	333	167
Butylbenzylphthalate	85-68-7	12,000,000	NA	333	333	167
Carbazole	86-74-8	27,000	rSRL	333	333	167
4-Chloro-3-methylphenol	59-50-7	NE	NA	333	333	167
4-Chloroaniline	106-47-8	240,000	rSRL	333	333	167
2-Chloronaphthalene	91-58-7	110,000	NA	333	333	167
2-Chlorophenol	95-57-8	63,000	rSRL	333	333	167
4-Chlorophenyl-phenylether	7005-72-3	NE	NA	333	333	167
Chrysene	218-01-9	640	GPL	333	333	167
Dibenzo(a,h)anthracene	53-70-3	690	rSRL	333	333	167
Dibenzofuran	132-64-9	140,000	rSRL	333	333	167
1,2-Dichlorobenzene	95-50-1	600,000	rSRL	333	333	167
1,3-Dichlorobenzene	541-73-1	530,000	rSRL	333	333	167
1,4-Dichlorobenzene	106-46-7	3,500	rSRL	333	333	167
3,3'-Dichlorobenzidine	91-94-1	1,200	rSRL	333	333	167
2,4-Dichlorophenol	120-83-2	180,000	rSRL	333	333	167
Diethylphthalate	84-66-2	49,000,000	NA	333	333	167
2,4-Dimethylphenol	105-67-9	1,200,000	rSRL	333	333	167
Dimethylphthalate	131-11-3	610,000,000	NA	333	333	167
Di-n-butylphthalate	84-74-2	6,100,000	NA	333	333	167
4,6-Dinitro-2-methylphenol	534-52-1	NE	NA	667	667	167
2,4-Dinitrophenol	51-28-5	120,000	rSRL	667	667	167
2,4-Dinitrotoluene	121-14-2	120,000	rSRL	333	333	167
2,6-Dinitrotoluene	606-20-2	61,000	rSRL	333	333	167
Di-n-octylphthalate	117-84-0	2,400,000	rSRL	333	333	167

Analyte	CAS Number	Project Screening Criteria (µg/kg)	Project Screening Criteria Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory Limits	
					RL (µg/kg)	MDL (µg/kg)
Fluoranthene	206-44-0	2,300,000	rSRL	333	333	167
Fluorene	86-73-7	26,000	GPL	333	333	167
Hexachlorobenzene	118-74-1	340	rSRL	333	333	167
Hexachlorobutadiene	87-68-3	7,000	rSRL	333	333	167
Hexachloroethane	67-72-1	39,000	rSRL	333	333	167
Indeno(1,2,3-cd)pyrene	193-39-5	690	rSRL	333	333	167
Isophorone	78-59-1	580,000	rSRL	333	333	167
2-Methylnaphthalene	91-57-6	NE	NA	333	333	167
2-Methylphenol	95-48-7	3,100,000	rSRL	333	333	167
4-Methylphenol	106-44-5	3,100,000	rSRL	333	333	167
Naphthalene	91-20-3	4,000	GPL	333	333	167
2-Nitroaniline	88-74-4	180,000	rSRL	333	333	167
3-Nitroaniline	99-09-2	18,000	rSRL	333	333	167
4-Nitroaniline	100-01-6	26,000	rSRL	333	333	167
Nitrobenzene	98-95-3	20,000	rSRL	333	333	167
2-Nitrophenol	88-75-5	NE	NA	333	333	167
4-Nitrophenol	100-02-7	NE	NA	667	667	167
n-Nitrosodimethylamine	62-75-9	11	NA	333	333	167
n-Nitroso-di-n-propylamine	621-64-7	78	NA	333	333	167
n-Nitrosodiphenylamine	86-30-6	110,000	NA	333	333	167
Pentachlorophenol	87-86-5	3,200	rSRL	667	667	167
Phenanthrene	85-01-8	NE	NA	333	333	167
Phenol	108-95-2	18,000,000	rSRL	333	333	167
Pyrene	129-00-0	14,000	GPL	333	333	167
1,2,4-Trichlorobenzene	120-82-1	62,000	rSRL	333	333	167
2,4,5-Trichlorophenol	95-95-4	6,100,000	rSRL	333	333	167
2,4,6-Trichlorophenol	88-06-2	6,100	rSRL	333	333	167

Notes: Laboratory Limits are laboratory-specific and may change based on the laboratory used.
µg/kg = microgram per kilogram; GPL = groundwater protection level; MDL = method detection limit; NA = not applicable; NE = not established; RL = reporting limit; rSRL = residential soil remediation level; SVOC = semi-volatile organic compound

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10.0 Assessments/Oversight

Formal field audits by QA personnel are not anticipated for this project. Identifying problems related to technical performance will be the responsibility of the technical staff working on this project. The Field Team Leader will assess any issues in the field, modify technical procedures if needed, and communicate with the Project Manager and any technical staff. Any changes in technical procedures will be documented in field notes and highlighted in reports related to this project.

Laboratory personnel will perform self-audits and institute corrective actions in accordance with their respective written procedures.

11.0 Data Verification and Validation

Data Verification (Step I) Process Table

Data Review Input	Description	Responsible for Verification
Chain of Custody Forms (COC)	The content of the COC will be reviewed daily and verified for completeness against the samples within the associated cooler. Once reviewed, a copy of the COC form will be filed with other project documents in the assigned project file. The original COC form will be taped inside the cooler for sample shipment.	Field Team Lead or Alternate
Fieldnotes/ Logbook	Field sampling data, i.e., field logbooks and field forms, will be reviewed and verified for completeness. Field notes/logbook will be forwarded to the Project Manager, reviewed, and placed in the project file. A copy of the field notes will be included with the monitoring reports.	Field Team Lead or Alternate
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the project file. If corrective actions are required, a copy of the documented corrective action taken will be attached to the appropriate audit report in the project file.	Field Team Lead or Alternate QA Coordinator or Alternate
Analytical Data Package	All laboratory data packages will be verified internally by the laboratory for completeness and technical accuracy before submission. All received data packages will be verified externally and internally according to the data validation process specified in the Validation (Steps II) Process Table below.	Laboratory PM QA Coordinator
Electronic Data Deliverables	The laboratory will verify 100% of electronic data deliverables internally, which will perform the work for completeness and technical accuracy between the EDD and the pdf copy data package before submission. 10% of received electronic data deliverables will be verified externally and internally against the laboratory data packages, with the percentage raised to 100% if discrepancies are found during the 10% verification.	Laboratory PM QA Coordinator

COC = chain of custody; EDD = electronic data deliverable; QA = quality assurance; PM = project manager

Data Validation (Steps II) Process Table

Validation Input	Description	Responsible for Validation
Communication	Establish that the required communication procedures were followed by field or laboratory personnel.	QA Coordinator
Methods (sampling and analysis)	Establish that the required sampling and analytical methods were implemented and that any deviations were noted. Evaluate whether proper procedures met performance criteria.	QA Coordinator
Location, maps, and sample ID numbers	Verify the accuracy and precision of the information under scrutiny.	Field Team Lead PM
Holding times	Ensure samples were analyzed within holding times specified in the method, procedure, or contract requirements. If holding times were not met, confirm that deviations were documented and appropriate notifications were made. Holding times or deviations will be noted in the lab analytical report.	QA Coordinator
List of project-specific analytes	Establish that the project-specific analytes were reported as specified in governing documents (i.e., analytical method, contract, etc.). Documentation will be in the lab analytical report.	QA Coordinator
Field logbook	Every week, the QA Coordinator or assignee will review and verify the completeness of the information in the field logbooks.	QA Coordinator or Alternate
Sampling instrument decontamination records	Establish that proper decontamination procedures were implemented by field sampling personnel.	QA Coordinator or Alternate
Chain of Custody Forms	Review COC records for completeness and accuracy daily. The QA Coordinator or assignee will look primarily for project information, sample analyses requested, and the number of field QC samples collected.	QA Coordinator or Alternate
Sample receipts	Check the sample cooler for compliance with temperature and packaging requirements.	QA Coordinator or Alternate

Validation Input	Description	Responsible for Validation
Sample logins	Review sample login for accuracy against the COC form.	QA Coordinator or Alternate
Sampling plan and procedures	Evaluate whether the sampling plan was executed as specified (i.e., the number, location, and type of field samples collected and analyzed as defined in the SAP). Evaluate whether sampling procedures were followed with respect to equipment and proper sampling support (i.e., techniques, equipment, decontamination, volume, preservation, temperature, etc.).	QA Coordinator or Alternate
Project quantitation limits	Determine that quantitation limits were achieved as outlined in the SAP and that the laboratory successfully analyzed a standard at the quantitation limit.	QA Coordinator
Performance criteria	Evaluate QC data against project-specific performance criteria in the SAP (i.e., evaluate quality parameters beyond those outlined in the methods).	QA Coordinator
Laboratory data packages	The QA Coordinator will validate laboratory data packages for technical accuracy. Review data packages for accuracy against the laboratory data.	QA Coordinator

Notes:

COC = chain of custody; QA = quality assurance; QC = quality control; SAP = Sampling and Analysis Plan

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12.0 Data Usability

The data usability assessment process is used to evaluate and document the usability of the data by considering the project DQOs and whether the data are suitable during the decision-making process. The analytical laboratory will be responsible for reviewing all analytical data generated under this contract to ensure that they meet the requirements of the SAP. Each analyst reviews the quality of their work based on established protocols specified in laboratory SOPs, analytical method protocol, project-specific requirements, and DQOs.

The data quality assessment process intends to establish the usability of the results with respect to the project DQOs. The usability assessment process will involve the QA Coordinator reviewing and evaluating the data for discrepancies or deviations. This assessment will assess the impact of the discrepancies or deviations on the usability of the data and evaluate whether all the necessary information has been provided for use in the decision-making process. Documentation of deviations in sampling activities, COC documentation, or holding times; compromised samples (i.e., damaged samples) and the need to resample; or changes to SOPs or methods that could potentially impact data quality will be provided in the soil monitoring report. QC sample results will be evaluated to assess whether unacceptable QC results (e.g., blank detections) impact data usability. Data use limitations will be discussed in the data usability assessment for data that do not meet the DQOs.

13.0 Documentation and Records

Field notes and measurements will be recorded in a field notebook, which the Field Team Leader will maintain. The respective laboratories performing the analyses will maintain original copies of COCs, raw data, and analytical results.

At the end of each day, the Field Team Leader will prepare a summary of the sampling activities for the day. The summary will be in writing but may be submitted as a hard copy or electronically. The summary should include the following:

- Name of Field Team Leader and Team Members
- Field and QC samples collected (including times)
- On-site measurements made and results obtained at each location
- Disposition of all samples (where they were delivered for analysis)
- Air bill numbers for all shipped samples
- Photocopies of COC
- Noteworthy Site observations

14.0 Quality Control/Data Management

Data from this sampling effort will be generated from three primary pathways: field activities, laboratory analytical data, and validated data. Data generated during field activities will be recorded using a field logbook and field forms. The field manager will review these forms for compliance with QC criteria established in the SAP for completeness and accuracy.

Upon sample arrival, the analytical laboratory will verify each sample's physical condition and ensure that all pertinent documentation associated with each sample is complete. Data generated from the laboratory analysis will be recorded in electronic data deliverables. Analytical laboratory staff will verify the data according to the process described in Section 12.0. The laboratory QA director will review the data before it is submitted for third-party data validation. Details on data validation and usability are provided in Sections 11.0 and 12.0.

Hardcopy field records, analytical laboratory data, and electronic data deliverables will be stored in a secure project file.

15.0 References

United States Department of Defense (DoD). 2021. *Quality Systems Manual for Environmental Laboratories, Version 5.4*. October.

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Figures

Figure 1: Area Location Map

Figure 2: MTR Site Location Map

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Figure 1: Area Location Map

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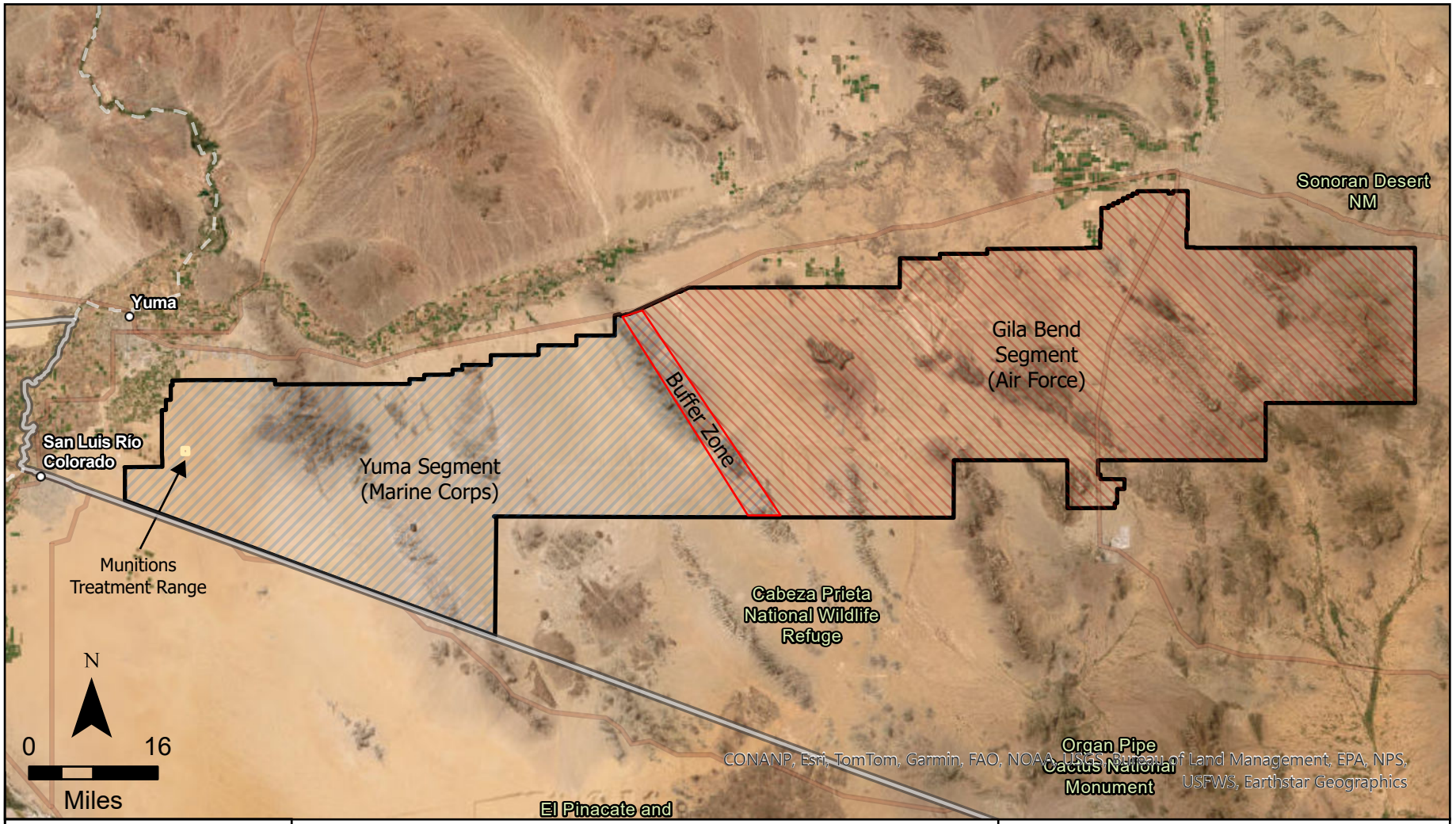

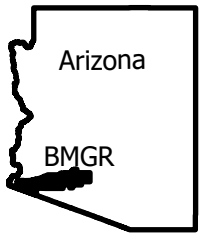

Munitions Treatment Range

Yuma Segment (Marine Corps)

Gila Bend Segment (Air Force)

Buffer Zone

BMGR Boundary

Figure 1
Area Location Map
Barry M. Goldwater Range

Figure 2: MTR Site Location Map

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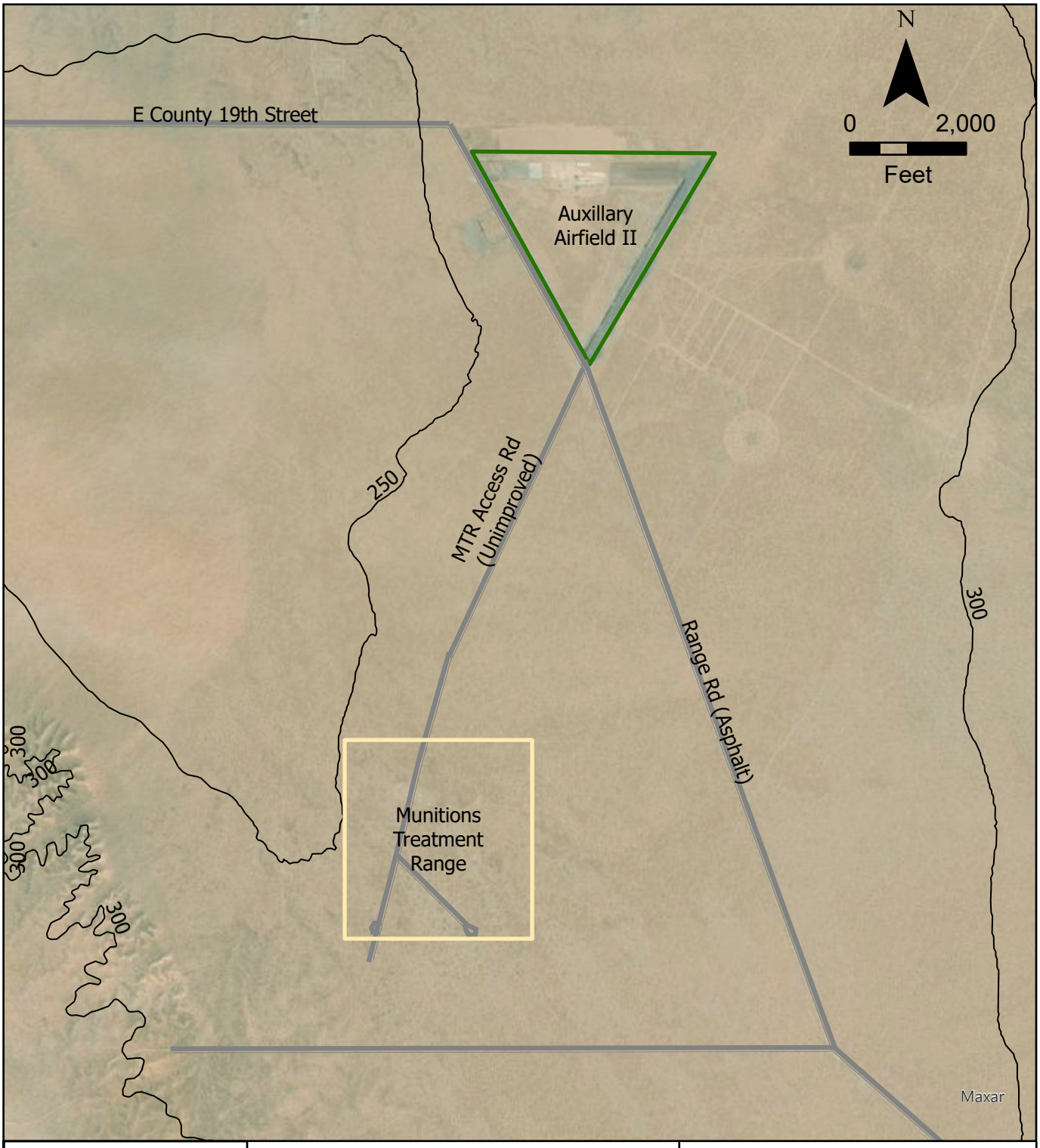

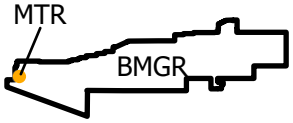

Munitions Treatment Range

Ground Elevation (feet)

Roads

Auxillary Airfield II

Figure 2
MTR Site Location Map
Barry M. Goldwater Range

Attachment 1: Standard Operating Procedures

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SOP 01

SAMPLE CUSTODY

1.0 Objective

Due to the evidentiary nature of samples collected during environmental investigations, possession must be traceable from the time the samples are collected until their derived data are introduced as evidence in legal proceedings. To maintain and document sample possession, sample custody procedures are followed. All paperwork associated with the sample custody procedures will be retained with the contractor's project files.

Note: This standard operating procedure (SOP) is intended to present basic sample custody requirements, along with common options. Specific sample custody requirements should be presented in the project-specific Sampling and Analysis Plan (SAP).

2.0 Background

2.1 Definitions

Sample – sample is material to be analyzed that is contained in single or multiple containers representing a unique sample identification number.

Sample Custody – A sample is under custody if:

1. It is in your possession
2. It is in your view, after being in your possession
3. It was in your possession and you locked it up
4. It is in a designated secure area

Chain-of-Custody Record – A chain-of-custody record is a form used to document the transfer of custody of samples from one individual to another.

Custody Seal – A custody seal is a tape-like seal that is part of the chain-of-custody process and is used to detect tampering with samples after they have been packed for shipping. A custody seal is placed on a filled and lidded sample container or a closed and sealed sample cooler. Some projects require each sample container to include a custody seal (if a sample cooler shows tampering with the custody seal, that cooler is flagged).

Sample Label – A sample label is an adhesive label placed on each sample containers to designate a sample identification number and other sampling information.

Sample Tag – A sample tag is attached with string to a sample container to designate a sample identification number and other sampling information. Tags may be used when it is not feasible to place adhesive labels on the container (e.g., in the case of small sampling tubes).

3.0 Responsibilities

Sampler – The sampler is personally responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

Field Team Leader – The field team leader (FTL) is responsible for ensuring that strict chain-of-custody procedures are maintained during all sampling events. The FTL is also responsible for coordinating with the subcontractor laboratory to ensure that adequate information is recorded on custody records. The FTL determines whether proper custody procedures were followed during fieldwork and decides if additional samples are required.

Field Sample Custodian – The field sample custodian, when designated by the FTL, is responsible for accepting custody of samples from the sampler(s) and properly packing and shipping the samples to the laboratory assigned to do the analyses. A field sample custodian is typically designated only for large and complex field efforts.

4.0 Required Supplies

- Chain-of-custody forms
- Sample labels
- Custody seals
- Clear tape

5.0 Procedures

5.1 Chain-of-Custody Record

This procedure establishes a method for maintaining custody of samples through use of a chain-of-custody record. This procedure will be followed for all samples collected or split samples accepted.

Field Custody

1. Collect only the number of samples needed to represent the media being sampled. If a project specific SAP is not available, determine the quantity and types of samples and sample locations prior to the actual fieldwork (refer to the appropriate governing agency for requirements [Arizona Department of Environmental Quality (ADEQ)]). As few people as possible should handle samples.
2. Complete sample labels or tags for each sample using indelible black or blue ink (or waterproof ink as appropriate). To reduce the potential for human error in the field, pre-printed labels are preferred, especially when sampling at a project site requiring a high number of sample containers..
3. Maintain personal custody of the samples (in your possession) at all times until custody is transferred for sample shipment or directly to the analytical laboratory.

Transfer of Custody and Shipment

1. Complete a chain-of-custody record for all samples. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the sample custodian in the appropriate laboratory. Duplicate information included on the chain-of-custody form in a project specific logbook or form. The process of duplication will assist in report preparation following the sampling event.

    - The date/time will be the same for both signatures when custody is transferred directly to another person. When samples are shipped via common carrier (e.g., Federal Express), the date/time will not be the same for both signatures. Common carriers are not required to sign the chain-of-custody record.
    - In all cases, it must be readily apparent that the person who received custody is the same person who relinquished custody to the next custodian.
    - Record a digital photograph of the completed chain-of-custody form for the project file and report preparation. Upload or e-mail the chain-of-custody photograph to the Project Manager or FTL as soon as possible.
    - If samples are left unattended or a person refuses to sign, this must be documented and explained on the chain-of custody record.

Note: If a field sample custodian has been designated, he/she may initiate the chain-of-custody record, sign, and date as the relinquisher. The individual sampler(s) must sign in the appropriate block, but does (do) not need to sign and date as a relinquisher.

2. Package samples properly for shipment and dispatch to the appropriate laboratory for analysis. The sample cooler should be packed with ice stored in Ziploc bags, to fill all remaining space. Each shipment must be accompanied by a separate chain-of-custody form sealed within a Ziploc bag and taped to the inside lid of the sample cooler record. If a shipment consists of multiple coolers, samples in the coolers may be recorded on a single chain-of-custody, with each cooler containing a chain-of-custody form as described in the previous sentence..
3. The original record will accompany the shipment, and the copies will be retained by the FTL and, if applicable, distributed to the appropriate sample coordinators. Freight bills will also be retained by the FTL as part of the permanent documentation. The shipping number from the freight bill shall be recorded on the applicable chain-of-custody record.

Procedure for Completing Chain-of-Custody Record

The following procedure is to be used to fill out the chain-of-custody record. The record provided herein is an example chain-of custody record. If another type of custody record (i.e., provided by the EPA contract laboratory program or a subcontract laboratory) is used to track the custody of samples, the custody record should be filled out in its entirety.

1. Record project number.
2. Record FTL for the project.
3. Record the name and address of the laboratory to which samples are being shipped.
4. Enter the project name/location or code number.
5. Record sample location number.
6. Note preservative added to the sample.
7. Record sample number.
8. Note preservatives added to the sample.
9. Note media type (matrix) of the sample.
10. Note sample type (grab or composite).
11. Enter date of sample collection.
12. Enter time of sample collection.
13. When required by the client, enter the names or initials of the samplers next to the sample location number of the sample they collected.
14. List parameters for analysis and the number of containers submitted for each analysis.
15. Enter matrix spike/matrix spike duplicate (MS/MSD) if sample is for laboratory quality control or other remarks (e.g., sample depth).
16. Sign the chain-of-custody record(s) in the space provided. All samplers must sign each record.
17. Review and fill out applicable areas as needed.
18. If sample tags are used, record the sample tag number in the “Remarks” column.
19. The originator checks information entered in Items 1 through 16 and then signs the top left “Relinquished by” box, prints his/her name, and enters the current date and time.
20. Send the complete chain of custody with the samples to the laboratory; Retain additional copies for the project file or distribute as required to the appropriate sample coordinators.
21. The laboratory sample custodian receiving the sample shipment checks the sample label information against the chain-of-custody record. Sample condition is checked and anything unusual is noted under “Remarks” on the chain-of custody record. The laboratory custodian receiving custody signs in the adjacent “Received by” box and keeps the copy.

5.2 Sample Labels and Tags

Unless the client directs otherwise, sample labels or tags will be used for all samples collected or accepted.

1. Complete on label or tag with the information required by the client for each sample container collected. A typical label or tag would be completed as follows:
   - Record the project code (i.e., project or task number).
   - Enter the station number (sample number) if applicable.
   - Record the date to indicate the month, day, and year of sample collection.
   - Enter the time (24 hour time format) of sample collection (3 pm is equivalent to 1500, whereas 3 am is equivalent to 0300).
   - Place a check to indicate composite of grab sample.
   - Record the station (sample) location.
   - Sign in the space provided.
   - Place a check next to 'yes" or "no" to indicate if a preservative was added.
   - Place a check under "Analyses" next to the parameters for which the sample is to be analyzed. If the desired analysis is not listed, write it in the empty slot. **Note**: Do not write in the box for "laboratory sample number."
   - Place or write additional relevant information under "Remarks."

2. Place adhesive labels directly on the sample containers. Place clear tape over the label to protect from moisture and to preserve the information on the label.
3. Double –check that the information recorded on the sample tag is consistent with the information recorded on the chain-of-custody. Sample labels should be checked in the field by at least two members of the sampling team.

5.3 Sample Shipping

The standard operating procedure listed below defines the requirements for packaging and shipping environmental samples.

- SOP 02, Packaging and Shipping Environmental Samples

SOP 2

PACKAGING AND SHIPPING ENVIRONMENTAL SAMPLES

1.0 Packaging and Shipping of All samples

This standard operating procedure (SOP) applies to the packaging and shipping of all environmental samples. If the sample is preserved or radioactive, the following sections may also be applicable.

Section 2.0-Packaging and Shipping Samples Preserved with Sodium Hydroxide
Section 3.0-Packaging and Shipping Samples Preserved with Hydrochloric Acid
Section 4.0-Packaging and Shipping Samples Preserved with Nitric Acid
Section 5.0-Packaging and Shipping Samples Preserved with Sulfuric Acid
Section 6.0-Packaging and Shipping Limited-Quantity Radioactive Samples

1.1 Objective

The objective of this SOP is to outline the requirements for the packaging and shipment of environmental samples. Additionally, Sections 2.0 through 6.0 outline requirements for the packaging and shipping of regulated environmental samples under the Department of Transportation (DOT) Hazardous Materials Regulations, the International Air Transportation Association (IATA), and International Civil Aviation Organization (ICAO) Dangerous Goods Regulations for shipment by air and applies only to domestic shipment (including data loggers and self-contained breathing apparatus (SCBAs) or bulk chemicals that are regulated under the DOT, IATA, and ICAO.

1.2 Background

1.2.1 Definitions

Environmental Sample- An aliquot of air, water, plant material, sediment, or oil that represents the contamination levels on a site. Samples of potential contaminants sources, like tanks, lagoons, or non aqueous phase liquids are normally not “environmental” for this purpose. This procedure applies only to environmental samples that contain less than reportable quantities for any foreseeable hazardous constituents according to DOT regulations promulgated in 49 CFR-Part 172.101 Appendix A.

Custody Seal- A custody seal is a narrow adhesive-backed seal that is applied to individual sample containers and/or the container (i.e., cooler) before offsite shipment. Custody seals are used to demonstrate that sample integrity has not been compromised during transportation from the field to analytical laboratory.

Inside Container- The container, normally made of glass or plastic, that actually contacts the shipped material. Its purpose is to keep the sample from mixing with the ambient environment.

Outside Container- The container, normally made of metal or plastic, that the transporter contacts. Its purpose is to protect the inside container.

Secondary Containment- The outside container provides secondary containment if the inside container breaks (i.e., plastic overpackaging if liquid sample is collected in glass.)

Excepted Quantity- Excepted quantities are limits to the mass or volume of a hazardous material in the inside and outside container below which DOT, IATA, or ICAO regulations do not apply. The excepted quantity limits are very low. Most regulated shipments will be made under limited quantity.

Limited Quantity- Limited quantity is the maximum amount of a hazardous material below which there are specific labeling or packaging exceptions.

Qualified Shipper- A qualified shipper is a person who has been adequately trained to perform the functions of shipping hazardous materials.

1.2.2 Discussion

Proper packaging and shipping is necessary to ensure the protection and the integrity of environmental samples shipped for analysis. These shipments are potentially subject to regulations published by DOT, IATA, or ICAO. Failure to abide by these rules places the risk of serious fines. The analytical holding for the samples must not be exceeded. The samples should be packed in time to be shipped for overnight delivery. Make arrangements with the laboratory before sending samples for weekend delivery.

1.2.3 Associated Procedures

- SOP 1-1, Sample Custody

1.3 Required Equipment

- Coolers with return address of the appropriate office
- Heavy-duty plastic garbage bags
- Plastic sip-type bags, small and large
- Clear tape
- Nylon reinforced strapping tape
- Duct tape
- Vermiculite (or equivalent nonflammable material that is inert and absorbent)
- Bubble wrap (optional)
- Ice
- Custody seals
- Completed chain-of-custody record or contact laboratory program (CLP) custody records, if applicable
- Completed bill of lading

- "This End Up" and directional arrow labels
- Check for any client-specific or laboratory requirements related to the use of absorbent packaging materials.

1.4 Packaging Environmental Samples

The following steps must be followed when packing sample bottles and jars for shipment:

1. Verify the samples undergoing shipment meet the definition of "environmental sample" and are not a hazardous material as defined by DOT. Professional judgment and/or consultation with qualified persons such as the appropriate health and safety coordinator or the health and safety manager should be observed.

2. Select a sturdy cooler in good repair. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler. Line the cooler with a large heavy-duty plastic bag.

3. Be sure that the caps on all bottles are tight (will not leak); check to see that labels and chain-of-custody records are completed properly (SOP 1-1, Sample Custody).

4. Place all bottles in separate and appropriately sized plastic zip-top bags and close the bags. Up to three VOA vials may be packed in one bag. Binding the vials together with a rubber band on the outside of the bag, or separating them so that they do not contact each other, will reduce the risk of breakage. Bottles may be wrapped in bubble wrap. Optionally, place three to six VOA vials in a quart metal can and then fill the can with vermiculite of equivalent. Note: Trip blanks must be included in coolers containing VOA samples.

5. Place 2 to 4 inches of vermiculite (or equivalent) into a cooler that has been lined with a garbage bag, and then place the bottles and cans in the bag with sufficient space to allow for the additional packing material between the bottles and cans. It is preferable to place glass sample bottles and jars into the cooler vertically. Glass containers are less likely to break when packed vertically rather than horizontally.

6. While placing sample containers into the cooler, conduct an inventory of the contents of the shipping cooler against the chain-of-custody record. The chain-of-custody with the cooler should reflect those samples within the cooler.

7. Put ice in large zip-top bags (double bagging the zip-tops is preferred) and properly seal. Place the ice bags on top of and/or between the samples. Several bags are required (dependent on outdoor temperature, staging

time, etc.) to maintain the cooler temperature at approximately 4° Celsius (C) if the analytical method requires cooling. Fill all remaining space between the bottles or cans with packing material. Securely fasten the top of the large garbage bag with fiber or duct tape.

8. Place the completed chain-of-custody record for the laboratory into a plastic zip-top bag, seal the bag, tape the bag to the inner side of the cooler lid and close the cooler.

9. The cooler lid shall be secured with nylon reinforced strapping tape by wrapping each end of the cooler a minimum of two times. Attach a completed chain-of-custody seal across the opening of the cooler on opposite sides. The custody seals should be affixed to the cooler with half of the seal on the strapping tape so that the cooler cannot be opened without breaking the seal. Complete two more wraps around with fiber tape and place clear tape over the custody seals.

10. The shipping container lid must be marked “THIS END UP” and arrow labels that indicate the proper upward position of the container should be affixed to the cooler. A label containing the name and address of the shipper shall be placed on the outside of the container. Labels used in the shipment of hazardous materials (such as Cargo Only Air Craft, Flammable Solids, etc.) are not permitted on the outside of containers used to transport environmental samples and shall not be used. The name and address of the laboratory shall be placed on the container, or when shipping by common courier, the bill of lading shall be completed and attached to the lid of the shipping container.

2.0 Packaging and Shipping Samples Preserved with Sodium Hydroxide

2.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 2-1
Excepted Quantities of Sodium Hydroxide Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
NaOH 30%	>12	0.08%	0	0.25	0.5	1	2

2.2 Responsibility

It is the responsibility of the qualified shipper to determine the amount of preservative in each sample so that accurate determination of quantities can be made.

2.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

- Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test
- Inner packings may consist of glass or plastic jars no larger than 1 pint
- Survey documentation (if shipping from DOE or radiological sites)
- Class 8 corrosive labels
- Orientation labels
- Consignor/consignee labels

2.4 Packaging Samples Preserved with Sodium Hydroxide

The following steps are to be followed when packaging NaOH limited-quantity samples shipments.

- All openings in sample containers will be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.

- All sample containers will properly labeled and secured with waterproof tape prior to sampling.

- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.
- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

3.0 Packaging and Shipping Samples Preserves with Hydrochloric Acid

3.1 Containers

The inner packaging container (and amount of preservative) that may be used for these shipments includes:

Table 3-1
Excepted Quantities of Hydrochloric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container		
	pH	Conc.	40ml	125 ml	250ml
HCl 2N	<1.96	0.04%	0 .2	0.5	1

3.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

3.3 Packaging Samples Preserved with Hydrochloric Acid

The following steps are to be followed when packaging limited-quantity sample shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container (40-ml VOA vials) in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

4.0 Packaging and Shipping Samples Preserved with Nitric Acid

4.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 4-1
Excepted Quantities of Nitric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
HNO_3 6N	<1.62	0.15%	0	2	4	5	8

4.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

4.3 Packaging Samples Preserved with Nitric Acid

The following steps are to be followed when packaging limited-quantity samples shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

5.0 Packaging and Shipping Samples Preserved with Sulfuric Acid

5.1 Containers

The inner packaging container (and amount preservative) that may be used for these shipments includes:

Table 5-1
Excepted Quantities of Sulfuric Acid Preservatives

Preservative	Desired in Final Sample		Quantity of Preservative (ml) for Specified Container				
	pH	Conc.	40ml	125 ml	250ml	500ml	1L
H_2SO_4 37N	<1.15	0.35%	0.1	.25	0.5	1	2

5.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservatives in each sample so that accurate determination of quantities can be made.

5.3 Packaging Samples Preserved with Sulfuric Acid

The following steps are to be followed when packaging limited-quantity samples shipments.

- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector's initials
  - Preservative
- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

- Place the bubble-wrapped container into a zip-type bag, removing trapped air.
- Glass containers may be placed inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
- Seal the garbage bag by tying or taping.
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler
- Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment.

6.0 Packaging and Shipping Limited-Quantity Radioactivity Samples

6.1 Containers

The inner packaging container that may be used for these shipments includes:

- Any size sample container

6.2 Description/Responsibilities

- The qualified shipper will determine that the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT.
- The qualified shipper will ship all samples that meet the Class 7 definition of radioactive materials and meet the activity requirements specified in Table 7 of 49 CFR 173.425, as Radioactive Materials in Limited Quantity. The qualified shipper will verify that all packages and their contents meet the requirements of 49 CFR 173.421, *Limited Quantities of Radioactive Materials.*
- The packaging used for shipping will meet the general requirements for packaging and packages specified in 49 CFR 173.24 and the general design requirements provided by 173.410. These standards state that a package must be capable of withstanding the effect of any acceleration, vibration, or resonance that may arise under normal condition of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole and without loosening or unintentionally releasing the nuts, bolts or other securing devices even after repeated use.
- If the shipment is from a DOE facility, radiological screenings will be completed on all samples taken. The qualified shipper will review the results of each screening (alpha, beta, and gamma speciation). Samples will not be shipped offsite until the radiological screening has been performed.
- The total activity for each package will not exceed the relevant limits listed in Table 7 of 49 CFR 173.425. The A_2 value of the material will be calculated based on all radionuclides found during previous investigations (if any) in the area from which the samples are derived. The A_2 values to be used will be the most restrictive of all potential radionuclides as listed in 49 CFR 173.435.
- The radiation level at any point on the external surface of the package bearing the sample(s) will not exceed 0.005 millisievert/hour (mSv/Hr); which is equivalent to 0.5 millirem/hour (mrem/Hr). These will be verified by dose and activity monitoring prior to shipment of the package.
- The removable radioactive surface contamination of the external surface of the package will not exceed the limits specified in 49 CFR 173.443(a).

- The qualified shipper will verify that the outside of the inner packaging is marked “Radioactive”.
- The qualified shipper will verify that the excepted packages prepared for shipment under the provisions of 49 CFR 173.421 have a notice enclosed, or shown on the outside of the package, that reads, **“This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910.”**

6.3 Additional Required Equipment

The following equipment is needed in addition to the required listed in Section 1.3.

- Survey documentation/radiation screening results (if shipping from DOE or radiological sites)
- Orientation labels
- Excepted quantities level
- Consignor/consignee

6.4 Packaging of Limited-Quantity Radioactive Samples

The following steps are to be followed when packaging limited-quantity sample shipment.

- The cooler is to be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.
- All openings in sample containers shall be sealed with waterproof tape from the inside to ensure control of interior contents. Also, the drain plug shall be taped from the outside of the cooler.
- All sample containers will be properly labeled and secured with waterproof tape prior to sampling.
- At a minimum the label must contain:
  - Project name
  - Project number
  - Date and time of sample collection
  - Sample location
  - Sample identification number
  - Collector’s initials
  - Preservative

- Wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.
- Place the bubble-wrapped container into a zip-type bag, removing trapped air.

- Glass containers inside a polyethylene bottle filled with vermiculite; seal the bottle.
- Place sufficient amount of vermiculite in the bottom of the cooler to absorb any leakage that may occur.
- Place a garbage bag in the cooler.
- Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
- Place sufficient amount of double-bagged ice around the samples to maintain the required temperature (4^0 C).
- Seal the garbage bag by tying or taping.
- Place a label marked Radioactive on the outside of the sealed bag.
- Enclose a notice that includes the name of the consignor or consignee and the following statement: **"This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910."**
- Note that both DOT and IATA apply different limits to the quantity in the inside packing and in the outside packing
- The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
- Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
- If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody form.
- Wrap strapping tape or dust tape around both ends of the cooler and around the cooler lid.
- Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
- Place a label on the front of the cooler with the company name, contact name, phone number, full address and state with zip code with both shipper and recipient.
- Affix package orientation labels on two opposite sides of the cooler/package.
- Affix a completed Excepted Quantities label to the side of the cooler/package.
- Secure any marking and labels to the surface of the cooler with clear water proof tape to prevent accidental removal during shipment.

7.0 References

U.S. Environmental Protection Agency, *Sampler's Guide to the Contract Laboratory Program*, EPA/540/P-90/106, December 1990

U.S. Environmental Protection Agency, Region IV, *Standard Operating Procedures and Quality Assurance Manual*, February 1991.

U.S. Environmental Protection Agency Rule, 40 CFR 136

Dangerous Goods and Hazardous Materials Inspection Checklist For Shipping Limited-Quantity

Sample Packaging

Yes	No	N/A	
☐	☐	☐	The VOA vials are wrapped in bubble wrap and placed inside a zip-type bag.
☐	☐	☐	The VOA vials are placed into a polyethylene bottle, filled with vermiculite, and tightly sealed.
☐	☐	☐	The drain plug is taped inside and outside to ensure control of interior contents.
☐	☐	☐	The samples have been placed inside garbage bags with sufficient bags of ice to preserve samples at 4° C.
☐	☐	☐	The cooler weighs less than the 66-pounds limit for limited-quantity shipment.
☐	☐	☐	The garbage bag has been sealed with tape (or tied) to prevent movement during shipment.
☐	☐	☐	The chain-of-custody record has been secured to the interior of the cooler lid.
☐	☐	☐	The cooler lid and sides have been taped to ensure a seal.
☐	☐	☐	The custody seals have been placed on both the front and back hinges of the cooler, using waterproof tape.

Air Waybill Completion

Yes	No	N/A	
☐	☐	☐	The shipper's name, company, and address; the account number, date, internal billing reference number; and the telephone number have been included.
☐	☐	☐	The recipient's name and company along with a telephone number have been included.
☐	☐	☐	The number of packages and their weights have been filled out.
☐	☐	☐	The Name, Place and Date, Signature, and Emergency Telephone Number appears at the bottom of the FedEx Airbill.
☐	☐	☐	The Emergency Contact Information at the bottom of Airbill is truly someone who can respond any time of the day or night.

Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Sub Risk	Quantity	Packing Instruction	Authorization
Hydrochloric Acid Solution	8	UN1789	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.

Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Sub Risk	Quantity	Packing Instruction	Authorization
Nitric Acid Solution (with less than 20%)	8	UN2031	II		1 plastic box x 0.5 L	Y807	Ltd. Qty.
Sodium Hydroxide Solution	8	UN1824	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.
Sulfuric Acid Solution	8	UN2796	II		1 plastic box x 0.5 L	Y809	Ltd. Qty.

Sample Cooler Labeling

Yes	No	N/A	
☐	☐	☐	The proper shipping name, UN number, and Ltd. Qty. appears on the shipping container
☐	☐	☐	The corresponding hazard labels are affixed on the shipping container; the labels are not obscured by tape.
☐	☐	☐	The name and address of the shipper and receiver appear on the top and side of the shipping container.
☐	☐	☐	The air waybill is attached to the top of the shipping container.
☐	☐	☐	Up arrows have been attached to opposite sides of the shipping container.
☐	☐	☐	Packaging tape does not obscure markings or labeling.

SOP 03

FIELD LOGBOOK CONTENT AND CONTROL

1.0 Objective

The objective of this standard operating procedure (SOP) is to set the criteria for content entry and form of field logbooks. Field logbooks are an essential tool to document field activities for historical and legal purposes, as well as to include in the contractors project file.

2.0 Background

2.1 Definitions

Biota- The flora and Fauna of a region

Magnetic Declination Corrections – Compass adjustments to correct for the angle between magnetic north and geographical meridians.

2.2 Discussion

Information recorded in field logbooks includes field team names, observations, data, calculations, date/time, weather, and description of the data collection activity, methods, instruments, and results. Additionally, the logbook may contain deviations from plans and descriptions of wastes, biota, geologic material and site features including sketches, maps or drawings as appropriate.

3.0 Responsibilities

Field Team Leader – The field team leader (FTL) is responsible for ensuring that the format and content of data entries are in accordance with this procedure.

Site Personnel- All employees who make entries in field logbooks during onsite activities are required to read this procedure prior to engaging in this activity. The FTL will assign field logbooks to site personnel who will be responsible for their care and maintenance. Site personnel will return field logbooks to the records file at the end of the assignment.

4.0 Required Supplies

- Site-specific plans
- Field Notebook
- Indelible black or blue ink pen
- Ruler/Scale

5.0 Procedures

5.1 Preparation

In addition to this SOP, site personnel responsible for maintaining logbooks must be familiar with procedures applicable to the field activity being performed. These procedures should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation. These procedures should be located at the field office.

Field logbooks shall be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the logbook. Prior to use in the field, the following information shall be recorded on the cover of the logbook:

- Field logbook Project Number/Document control number
- Activity (if the logbook is to be activity-specific) and location
- Name of project contact and phone number(s)
- Start date
- In specific cases, special logbooks may be required (e.g. waterproof paper for stormwater monitoring etc.)

5.2 Operation

Requirements that must be followed when using a logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the logbook. If data collection forms are specified by an activity-specific plan, this information need not be duplicated in the logbook. However, any forms used to record site information must be referenced in the logbook.
- Do not start a new page until the current page is full or has been marked with a single diagonal line and initialed by the author so that additional entries cannot be made. Use both sides of each page.
- Do not erase or blot out any entry at any time. Indicate any deletion by a single line through the material to be deleted. Initial and date each deletion. Take care to not obliterate what was written previously.
- Do not remove any pages from the book.

Specific requirements for field logbook entries include:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial and date all changes (changes are to be crossed out with a single line, initialed, and dated).
- Multiple authors must sign out the logbook by inserting the following:
- Date and Time

- Name of individual making entry
- Names of field team and other persons onsite
- Description of activity being conducted including installation, site, or location (i.e., well, boring, sampling location number) if appropriate.
- Weather conditions (i.e. Temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
- Level of personal protection to be used
- Required calibration information
- Serial/tracking numbers on documentation (e.g. carrier air bills)

Entries into the field logbook shall be preceded with the time (written in 24 hour time format) of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being performed. All measurements made and samples collected must be recorded unless they are documented by automatic methods (E.G. data logger) or on a separate form required by an operating procedure. In these cases, the logbook must reference the automatic data record or form.

At each location where a sample is collected or an observation or measurement made, a detailed description of the location of the location is required. Use a compass (include a reference to magnetic declination corrections), scale, or nearby survey markers, as appropriate. A sketch of the location location may be warranted. All maps or sketches made in the logbook should have descriptions of the features shown and a direction indicator. It is preferred that maps and sketches be oriented so that north is toward the top of the page. Maps, sketches, figures, or data that will not fit on a logbook page should be referenced and attached to the logbook to prevent separation.

Other events and observations that should be recorded include:

- Changes in weather that impact field activities.
- Deviations from procedures outlined in any SOPs or governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personal protection equipment.
- Health and safety related issues.
- Emergencies.
- Site visitors.

5.3 Post-Operation

To guard against loss of data due to damage or disappearance of logbooks, completed pages shall be scanned and saved in the electronic project file at the earliest opportunity. For longer duration sampling events (weeks to months), this action is preferred at the end of each work week. Duplication of logbook documentation is crucial in maintaining official record of on-site technical work. In some cases, the contractors clients may request logbook records of technical work

performed by the contractor. It is the contractor's responsibility to maintain official records of all contract work, not only for company files, but for client files. Other field records shall be scanned and saved regularly and as promptly as possible to the electronic project file.

At the conclusion of each activity or phase of site work, the individual responsible for the logbook will ensure that all entries have been appropriately signed and dated, and that corrections were made properly (single lines drawn through incorrect information, then initialed and dated). The completed logbook shall be submitted to the records file.

6.0 Restrictions/ Limitations

Field logbooks constitute the official record of onsite technical work, investigations, and data collection activities. Their use, control and ownership are restricted to activities pertaining to specific field operations carried out by personnel and their subcontractors. They are documents that may be used in court to indicate dates, personnel, procedures, and techniques employed during site activities. Entries made in these logbooks should be factual, clear, precise, and non-subjective. Field logbooks, and entries within, are not to be used for personal use.

SOP 4

FIELD SAMPLE NUMBERING

1.0 Purpose

This Standard Operating Procedure (SOP) establishes the guidelines and procedures for sample numbering. Sample numbering is required to identify, track, and trace samples from the time of collection until the time of disposal. Additional specific procedures and requirements are provided in the Tier II Uniform Federal Programs Quality Assurance Project Plan (UFP-QAPP).

2.0 Definitions/Materials

Decision Unit (DU) – DU is defined as the smallest volume of soil collected over an area for the purposes of decision-making

Sample – sample is material to be analyzed that is contained in single or multiple containers representing a unique sample identification number.

Sample Label – A sample label is an adhesive label placed on each sample containers to designate a sample identification number and other sampling information.

Sample Number or Sample Identification (Sample ID) – Sample ID is a unique alphanumeric identification assigned to each and all physical samples collected as part of any given project.

Sample Tag – A sample tag is attached with string to a sample container to designate a sample identification number and other sampling information. Tags may be used when it is not feasible to place adhesive labels on the container (e.g., in the case of small sampling tubes).

3.0 Responsibility

3.1 Field Team Lead

The Field Team Lead is responsible for ensuring that all sample collection and numbering activities are conducted and documented in accordance with this SOP and any other applicable procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control. The Field Team Lead is also responsible for the implementation of corrective action (i.e., retraining personnel and additional review of SOPs) if case of deviation from the approved procedure.

3.2 Project Chemist

The Project Chemist is responsible for issuing variances to sample labeling requirements and issuing nonconformance approvals if problems occur.

3.3 Field Staff

All staff are responsible for reporting deviations from this SOP to the Field Team Lead.

4.0 Required Supplies

- Chain-of-custody forms
- Sample labels
- Custody seals
- Clear tape

5.0 Procedures

This section contains the procedures for sample numbering and labeling. Sample numbering is required to provide a means by which samples can be identified, tracked, and traced from the time of collection until the time of disposal. The details within this SOP should be used in conjunction with the UFP-QAPP, which provides the following information**:**

- Sample collection objective
- Numbers, types, and locations of samples to be collected.
- Location identifiers (location IDs) for planned sample points
- Date and time of collection
- Sampler's initials
- Any additional sample numbering requirements or procedures beyond those covered in this SOP, as necessary.

6.0 Sample Numbering

- The sample numbers should be as simple and preferably as short as possible; however, they should also be compatible with the laboratory analytical tracking system and the data management system to be used for the project sample data.
- A unique sample number will be assigned in the field to each sample to be submitted for analysis.
- The sample numbers will be assigned sequentially (e.g. DU 1-ISM-01-1 through DU 1-ISM-01-10) as the samples are collected. Both primary (non-QC) and QC samples will be assigned sample numbers with the same prefix so that the laboratory will be unable to distinguish between the QC and non-QC samples.

- The sample number will be recorded, using indelible ink, directly on the sample label attached to each sample per SOPs 08 and 09.

- The sample number must also be recorded on the Field logbook, sample bag or jar, and Chain-of-Custody Form.

- It is recommended that one person (either the Project Chemist, Field Team Lead, or other designee) be responsible for issuing sample numbers to field sampling personnel and for soil samples, ensuring that the sample sequence numbers are applied to samples in the sequence in which they are collected.

- It is also recommended the Field Team Lead or designee be responsible for keeping a master sample log listing in the field logbook, including the sample numbers and a brief description of the samples collected.

7.0 Chain of Custody Procedure

This will be done in accordance with the procedure outlined in SOP 8. Samples are in custody if they are in the custodian's view, stored in a secure place with restricted access, or placed in a container secured with custody seals. Samples will not be outside of designated personnel's custody unless the samples have been transferred to a secure area (i.e., locked up and custody sealed) or transferred to the laboratory. If the samples cannot be placed in a secure area, a field team member will always physically remain with the samples (e.g., during breaks or mealtimes). A COC record will be signed by each person who has custody of the samples and will always accompany the samples. Copies of the COC form will be included in the laboratory and QA/QC Reports.

The COC will either be electronic or a hard copy with information on:

- Site
- Sample Identification completed using a seven-digit unique designation according to the following:
    - A three-character designation of the DU (i.e. DU1)
    - A two- or three-character designation for type of sample (i.e. ISM or SS [soil sample])
    - A two-character designation for primary, duplicate or QC sample (i.e. 01 for primary, 03 for duplicate, 05 for a source blank and 07 for an equipment blank.
    - A one-character designation for consecutive samples from the same location (i.e. 1 for the first sample within a DU)
    - Each character will be separated by a dash (i.e. DU 1-ISM-01-1).
- Date and Time of Sample Collection
- Sample Type
- Number of Samples
- Field Supervisor's Name and Team Members Responsible for Collection of the Listed Samples
- Number of Containers (Coolers) Shipped
- Requested Analyses for Each Sample
- Name, Date, Time, and Signature of the Relinquishing and Receiving Personnel (commercial shipment carriers not included)

7.1 Sample Labels and Tags

Unless the client directs otherwise, sample labels or tags will be used for all samples collected or accepted.

a. Complete on label or tag with the information required by the client for each sample container collected. A typical label or tag would be completed as follows:
   - Record the project code (i.e., project or task number).
   - Enter the station number (sample number) if applicable.
   - Record the date to indicate the month, day, and year of sample collection.
   - Enter the time (24-hour time format) of sample collection (3 pm is equivalent to 1500, whereas 3 am is equivalent to 0300).
   - Place a check to indicate composite of grab sample.
   - Record the station (sample) location.
   - Sign in the space provided.
   - Place a check next to 'yes" or "no" to indicate if a preservative was added.
   - Place a check under "Analyses" next to the parameters for which the sample is to be analyzed. If the desired analysis is not listed, write it in the empty slot. **Note**: Do not write in the box for "laboratory sample number."
   - Place or write additional relevant information under "Remarks."

b. Place adhesive labels directly on the sample containers. Place clear tape over the label to protect from moisture and to preserve the information on the label.

c. Double - check that the information recorded on the sample tag is consistent with the information recorded on the chain-of-custody. Sample labels should be checked in the field by at least two members of the sampling team.

SOP 05

DRILLING

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the minimum requirements needed to ensure the contractor's employees safely perform drilling operations. Drilling operations are an inherently dangerous activity because they require motorized equipment, the equipment has many moving parts, heavy and awkward components and tools are required, the drill rig may have a large mast, and drilling penetrates the subsurface where potential unknown conditions or hazards may exist. The primary drilling hazard topics covered in this SOP include utility contact prevention, overhead hazards, moving components, and pressurized lines.

2.0 ASSOCIATED STANDARD OPERATING PROCEDURES

The following procedures are associated with drilling activities:

- Drilling – Lithologic Logging
- Drilling – Subsurface Soil Sampling

3.0 RESPONSIBILITIES

Responsible personnel are described below.

3.1 Project Manager

Responsible for ensuring all personnel are following SOPS, that a Competent Person has been assigned, and that oversight is in place and being implemented.

3.2 Competent Person

See Section 4.0 for Key Competent Person responsibilities.

3.3 Site Supervisor and/or Site Safety Officer

Responsible for ensuring preparatory actions are completed before the event, that site personnel are following required SOPs, and performing or assigning the completion of required inspections and safety checks.

3.4 Site Personnel

Site personnel (employees, contractors, subcontractors, etc.) must be aware of their actions and the potential risks associated with them and follow procedures to ensure protection from accidents and injury.

4.0 PROCEDURE

Primary safety procedures for drilling safety are detailed in this section.

4.1 Subsurface Utility Contract Prevention

All possible checks should be made to avoid contacting subsurface utilities. Whenever possible, all available utility locator services should be used to ensure clearance. The following provides a list of primary actions that should be followed to avoid contacting subsurface utilities.

- Understand and follow location-specific regulations and client requirements for identifying, documenting, and avoiding subsurface utilities and other subsurface structures.
- Ensure the property owner is aware of the planned intrusive activities and where they will occur.
- All drilling should occur at a minimum of 5 feet from any known or suspected location of an underground structure or utility.
- Perform site visit to locate/mark drilling locations. Prior to site visit, assess all available information about potential subsurface structures in the immediate work area. Before marking planned drilling locations, walk the site looking for any indications suggesting where subsurface structures or utilities might exist and provide adequate clearance. Indications of potential utilities include trench cut pavement, different aged or color pavement, sagging pavement, etc.). Ensure the planned drilling locations are clearly and accurately marked.
- Contact One-Call utility service notification center and provide notification of plans, request utility mark out, and ensure all applicable utility companies will be notified. Track notification ticket and ensure sufficient time is provided for the process to be performed.
- Utility lines identified in the immediate vicinity of the planned drilling location will be marked using color-coded surveyor paint or other marking methods if paint cannot be used. Utilities are usually identified using standardized color coding using the following colors:
    - RED – Electric power lines
    - YELLOW – Gas, oil, steam, or petroleum, or gaseous materials
    - ORANGE – Communication, alarm or signal lines, cables, or conduit
    - BLUE – Potable water
    - PURPLE – Reclaimed water, irrigation, and slurry lines
    - GREEN – Sewers and drain lines
    - WHITE – Proposed excavation

- Contact property owner, if appropriate, and request utility clearance/mark out if they have that capability or require that action (e.g., military facility dig permit).
- Have geophysical survey performed of all planned drilling locations. Especially in areas that are not covered by the One-Call utility service notification center.
- All markings showing the location of utilities near planned drilling locations should be documented in photos, logbook, and/or drawings to record their identified locations. Markings should be preserved and reapplied to ensure they remain for as long as needed.
- Safety planning documents (e.g., accident prevent plan, Activity Hazard Analysis, etc.) must identify the emergency procedures to be taken should underground utilities be encountered and field personnel will be briefed on those procedures.
- A designated Competent Person will be on site when intrusive activities are being performed.
- If system emergency shut offs exist at the site, their location(s) should be known to key personnel during drilling.
- “No Drill Zones” should be established in areas with known USTs, subsurface utility congestion, and the potential to encounter high risk utilities.
- All planned drilling locations must be cleared manually to the diameter of the drill pipe or auger to a dept of five feet below ground surface (bgs) by hand digging (hand auger, post hole digger, etc.) or vacuum excavation.
- Drilling location that cannot be manually cleared to 5 feet bgs due to technical requirement (e.g., shallow temporary vapor probe installation) or site conditions (i.e., shallow groundwater, refusal due to rocks, ground is too hard, etc.) will require authorization from management to drill those locations. That authorization will include confirming that all possible actions have been taken to attempt to ensure utility contact avoidance.
- If pea gravel or other indications of human activity are encountered during manual boring location clearance or drilling, work should stop, and a determination made as to whether utilities are possibly present. When in doubt, do not drill at that location.
- Personnel are required to immediately report to the Competent Person and site supervisor any utility near miss or utility contact. The Competent Person or site supervisor, as necessary, will notify management, the property owner, and utility owner if a utility is damage.
- If contact with a utility results in an emergency, the procedures put forth in the safety planning documents will be implemented.

4.2 Overhead Hazards

Standard practices should be used, and all possible checks should be made to avoid contacting overhead hazards. The following provides a list of primary actions that should be used to avoid contacting overhead hazards.

- Work activity adjacent to overhead lines shall not be initiated until a survey has been made to ascertain the safe clearance from energized lines.
- Work activity that could affect or be affected by overhead lines shall not be initiated until coordinated with the appropriate utility officials.
- Any overhead wire shall be considered energized unless the person owning such line or operating officials of the electrical utility supplying the line certifies that it is not energized, and it has been visibly grounded and tested.
- Operations adjacent to overhead lines are prohibited unless at least one of the following conditions is satisfied:
    - Power has been shut off and positive means taken to prevent the lines from being energized
    - Equipment or any part of the equipment does not have the capability of coming within the minimum clearance from energized overhead lines as specified in the below minimum clearance requirement table.
    - The equipment has been positioned and blocked to assure no part, including cables, wire rope, components, and attachments, can come within those clearances and a notice of the minimum required clearance has been posted at the operator's position

Minimum Clearance from Energized Overhead Electric Lines

Voltage (nominal, kilovolt, alternating current)	Minimum Clearance Distance
Up to 50	10 feet (3 meters)
51 – 200	15 feet (4.6 meters)
201 – 350	20 feet (6 meters)
351 – 500	25 feet (7.6 meters)
501 – 750	35 feet (10.7 meters)
751 – 1000	45 feet (13.7 meters)
Over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

Note: All dimensions are distances from live part to equipment and components at any potential reach.

Reference: United States Army Corps of Engineers (USACE). 2014. Safety and Health Requirements Manual, EM 385-1-1, Washington, D.C., November 30.

- Overhead utility locations must be marked where heavy equipment or other equipment has the potential for contacting overhead or adjacent utilities.
- Daily site inspections are required to determine where activities will take place and to ensure all adjacent above ground utilities are identified, marked, and/or protected, to prevent contact. Provide updated information to employees in daily safety tailgate meetings.
- Every time, before moving the drill rig, checks should be made to determine if there is a potential to encounter overhead hazards. In many instances, encountered overhead hazards were known but forgotten and a check was not made before movement resulting in damage and/or injury.
- Extreme caution will be taken when raising or lowering the drill mast when in the vicinity of overhead utilities
- Drill rigs should only be moved once the derrick has been lowered. Travel with the drill mast raised is not be permitted.
- When moving a drill rig, a spotter will be used whenever near overhead hazards, nearby structures or equipment, and when visibility is restricted.

4.3 Moving Components

To operate, drill rigs require many moving components and moving components pose many risks. The following identifies potential risks and control measures for dealing with drill rig moving parts.

- All drilling equipment and the drilling area shall be inspected before each shift by a Competent Person.
- All personnel should ensure a safe distance exists between personnel and moving components when drilling. The operator shall verbally alert employees and visually ensure employees are clear from dangerous parts of equipment before starting or engaging equipment.
- Before approaching an operating drill rig, personnel must be established eye contact with the equipment operator.
- Drill crewmembers shall not wear loose clothing, jewelry, or equipment that might become caught in moving machinery. High visibility vests used on drilling rigs, if required, must be of the break-away type. Long hair must be contained so it cannot be caught in moving machinery.
- Drilling equipment shall be equipped with at least two easily accessible emergency shutdown devices (“kill switches”), one for the operator and one for the helper. Both kill switches will be tested each day before beginning drilling.
- All required guarding and safety devices shall be provided, used, and maintained. Ensure all machine guards are in place and functioning correctly.

- Drill rods shall not be run or rotated through rod slipping devices. No more than one (1) foot of drill rod column shall be hoisted above the top of the drill mast.
- Auger Guard: A means shall be provided to guard against employee contact with the auger (e.g. guard around the auger; barricade around the perimeter of the auger; electronic brake activated by a presence-sensing device). If an auger guard is infeasible due to type of drill equipment being used, employees must maintain a safe/clear distance while the auger is rotating. Only when the drill has stopped rotating, the controls returned to the neutral position, and a clear signal has been given by the operator and understood by the helper that it is safe, shall the employee proceed to approach the drill. If an auger guard will not be used, a risk assessment shall be performed by the Competent Person and documented in the accident prevention plan and Activity Hazard Analysis as to why the use of an auger guard is not practical. Identification of additional precautions and/or controls shall be identified to ensure an equal level of safety is accomplished.
- Drill rod tool joints shall not be made up, tightened, or loosened while the rod column is supported by a rod-slipping device.
- Augers shall be cleaned only when the rotating mechanism is in neutral and the auger stopped. Long-handled shovels shall be used to move cutting from the auger.
- Hoists shall be used only for their designed intent and shall not be loaded beyond their rated capacity. When using the hoist, ensure that during the lift or if the lift should fail that individual will not be struck by or caught between the item being moved or lift components should they fail.
- Perform lockout/tagout procedures prior to accessing, disconnecting, or attempting repairs to drill rig moving components.

4.4 Pressurized Lines

The following identifies potential risks and control measures for dealing with pressurized drill rig lines.

- Pressurized equipment and systems shall be inspected, and performance tested before being placed in service and after any repair or modification.
- Safety and relief valves shall be provided on all pressurized equipment and systems.
- Drilling equipment shall be equipped with at least two easily accessible emergency shutdown devices (“kill switches”), one for the operator and one for the helper. Both kill switches will be tested each day before beginning drilling.
- Pressurized manual equipment, subject to whipping or rotation if released, shall be provided with an automatic shut-off or control of the dead-man type.

- Connections with high pressure hoses must be secured with a safety lashing/whip check. Safety lashings shall consist of two metal hose clamps connected by a suitably flexible strong cable, chain, or wire with the metal hose clamps attached to the hose ends separated by quick makeup connection.
- Hydraulic system pressurized hoses, clamps, and safety cables on drill rigs should be visually inspected daily and whenever damage or strain might have occurred.
- Mixing and grout pumps when in operation are pressurized systems. When working with mixing/grout pumps ensure connections between piping, hoses, and pumps are secure and safety cables attached if required to ensure dangerous eruptions or spraying of fluids does not occur. If material is being pumped ensure the energy being put forth will not short circuit in a fashion that might pose a potential risk.
- Perform lockout/tagout procedures prior to accessing, disconnecting, or attempting repairs to drill rig pressurized lines and associated components.

5.0 REFERENCES

United States Army Corps of Engineers. 2014. Safety and Health Requirements Manual, EM 385-1-1, Washington, D.C., November 30.

SOP-06

LITHOLOGIC LOGGING

1.0 OBJECTIVE

This technical standard operating procedure (SOP) governs basic lithologic logging of surface and subsurface soil samples collected for field operations at the Munitions Training Range (MTR) site. The purpose of this SOP is to present a protocol and standardized documentation format for lithologic observations. Protocols for recording basic lithologic data including, but not limited to, soil types (per the Unified Soil Classification System [USCS] classification), presence of fill (and associated deleterious materials), lithologic names, color, moisture, density, contacts, and secondary features such as organic material and fractures.

The goal of this SOP is to have consistent descriptions of the subsurface materials.

2.0 BACKGROUND

Lithologic information about soil, rock, and fill assists in the understanding of subsurface conditions, moisture infiltration, groundwater flow, and potential contaminant migration pathways.

2.1 DEFINITIONS

The following list corresponds to the description sequences outlined in Section 5.2.1. An example lithologic log is included in Attachment A.

Name of Sediment or Rock – In naming unconsolidated sediments, the logger shall describe the grain size, distribution, color, and moisture content, and determine the presence of fill materials. In naming sedimentary rocks, the logger shall examine the specimen for mineralogy and use the appropriate rock description.

Color - Color may be determined using the appropriate Munsell color chart (soil or rock) and listing the Munsell number that corresponds to the color. If an unconsolidated material is mottled in color, the ranges in color shall be described. When describing core samples with several individual colors, individual color names shall be listed, and an overall best color name shall be given.

Degree of Consolidation – The degree of consolidation refers to how well the material has been indurated. Unconsolidated sediments may be compacted somewhat and should be described as loose, moderately compacted, or strongly compacted. In some cases, they may be slightly cemented by caliche and should be described as slightly cemented, moderately cemented, or strongly cemented. Sedimentary rocks are typically indurated but may vary in the degree of cementation.
These rocks should be described as friable, moderately friable, or well indurated. If the logger believes he/she can identify the cementing material, then it shall be included in the description.

Moisture Content – Moisture content refers to the amount of water within the sediment or the matrix. Sedimentary rocks and unconsolidated sediments may have associated

moisture within and should be described as dry, slightly moist, medium moist, moist, wet (not flowing), or saturated (flowing water).

Evidence of Contamination – The logger should examine the sample/core and note any obvious signs of contamination such as streaking, free product, odor, or discoloration. These observations will be noted in the field book and on the lithologic log, as well as screening measurements from the photoionization detector (PID) and radiation (alpha, beta) probes.

Description of Contacts – The logger will note changes in lithology. These changes may be gradational contacts within sediments or may be sharp contacts such as sediments over rocks. The logger should describe whether the contacts are gradational or sharp and note the depth below the surface.

Composition – The composition of the rock refers to the mineralogy of the material encountered. The logger should describe the mineralogy if it can be determined.

2.2 ASSOCIATED PROCEDURES

- SOP, *Surface Soil Sampling*
- SOP, *Subsurface Soil Sampling with Hand Auger*
- SOP, *Field Data Collection Documents, Content, and Control*

2.3 DISCUSSION

The subsurface sampling techniques used at MTR is Direct Push all result in sandy soil being brought to the surface for description and logging. The soil boring, core retrieval, and lithologic logging will be conducted under the guidance of a Arizona professional geologist, or other earth scientist under a geologist's supervision. An important aspect of soil sampling is the identification and differentiation of native soil/rock from the site. To help in this task, it is important to use the USCS classification scheme, and uniform and consistent descriptions. Soil and rock descriptions will be consistent with ASTM 2488-06 (Standard Practice for Description and Identification of Soils – Visual Manual Procedure). This SOP also provides a sequence for recording information on a standardized log form to make descriptions as uniform and consistent as possible.

The local geology of MTR is well characterized. Local soil and rock are well documented. As such, detailed lithologic logs are not necessary. The primary goal of lithologic logging is to document the stratigraphic sequence, the presence of fill or native soil, occurrence and type of debris and/or staining, associated PID and radiological screening values, and deviations from the normal or anticipated stratigraphic section.

In addition, all SOPS will be on hand with the field sampling crew.

3.0 GENERAL RESPONSIBILITIES

Field Team Leader (FTL) – The FTL is responsible for maintaining logbooks and qualified field staff.

Site Geologist – Individual responsible for describing and logging of all soil cuttings/samples and all rock per this SOP. A geologist is required to lead this project work.

4.0 REQUIRED EQUIPMENT

The description of subsurface lithologies requires a minor amount of field equipment for the geologist. This section provides a list of equipment to be used by the lithologic logger but does not include equipment such as drill rigs, PID, sampling equipment, and personal protection equipment. The following is a general list of equipment that may be used:

- Field logbook and lithologic log form
- Clipboard
- Munsell color chart for soil
- Waterproof pens
- 10x magnifying hand lens
- Knife or cutting tools

5.0 PROCEDURES

5.1 OFFICE

- Obtain field logbook and lithologic log forms
- Coordinate schedules/actions with
- Obtain necessary field equipment (see above)
- Review field support documents (i.e., Field Sampling Plan [FSP] Addendum, health and safety plan)
- Review applicable geologic references such as historic lithologic logs from the site and/or geologic maps, as needed

5.1.1 DOCUMENTATION

Record observations in a bound field logbook and/or on individual lithologic log forms. Site geologists (i.e., lithologic loggers) will follow the general procedures for keeping a field logbook. If using a bound field logbook, record the same data required on the lithologic log form. Data from the field logbook must be transcribed to the lithologic log form if filling in the form in the field is not feasible. In this case, the data must be the identical to those recorded in the field logbook. Post- logging editing of field logbook data is not allowed. In addition, if data are transcribed to the lithologic log form, it must be completed within 24 hours of the original data recording. All blanks in the lithologic log form must be filled out; if an item is not applicable, an “NA” shall be entered.

The Lithologic Log Form shall be filled out according to the following instructions. The front page of the form contains general information:

- The project name, sample location, subarea, and sample type
- Date that the drilling activity was started and completed
- Name of the person logging along with the beginning depth-end depth (in feet)
- Borehole diameter(s) and drilling methods
- Name and company of the driller and the type of sampling tool used

A map showing the soil sampling location may be attached.

The continuation page(s) of the log form should be completed according to the instructions provided within this section and according to the sequence provided in Section 5.2.1. The depth column refers to the depth below ground surface (bgs) in feet. The tick marks can be arbitrarily set to any depth interval depending on the scale needed except where client
requirements dictate the spacing. The lithology column shall contain the USCS soil type/rock type; schematic symbols are not required. Use a single X to mark the area where no core was recovered, and notes shall be recorded as to why the section was not recovered. Sharp or abrupt contacts between lithologies will be indicated by a solid horizontal line. Gradational changes in lithologic composition should be noted. PID and radiation measurements will be recorded within the PID column at the appropriate depth. The description column, where the lithology is described, is the most important part of the lithologic log.
In completing this section, use the applicable reference charts and complete according to the sequence in Section 5.2.1. The
sample interval column is reserved for noting any samples taken and processed for the laboratory. The sample number shall be filled in at the appropriate depth. The last column

refers to the percent core recovery. The geologist will estimate the amount recovered and record the percentage at the appropriate depth.

In addition to the information on the log form, the geologist will record the appropriate information into the logbook when there is a rig shutdown, rig problems, failures to recover cores, or other issues.

5.2 GENERAL GUIDELINES FOR USING AND SUPPLEMENTING LITHOLOGIC DESCRIPTIVE PROTOCOLS

This SOP is intended to serve as a guide for recording basic lithologic information. The descriptive protocol presented here must be followed in making basic observations. Selected information charts may be used for classification and naming of rock, sediment, and soil. Some observations will be common to all rock and soil descriptions. All descriptions shall include as appropriate: name of sediment or rock, color (using the Munsell color charts), moisture content, composition, significant inclusions, and degree of consolidation or induration, and the presence and type of fill materials, if identified. The description
of each category shall be separated by a semicolon. Any interpretive comments will be segregated from lithologic descriptions and recorded in the remarks column.

Describe all unconsolidated sediment and soil according to the USCS. It is often more practical to use abbreviations for often- repeated terminology when recording lithologic descriptions. Abbreviations are allowed; however, the abbreviation and its meaning must be recorded on the lithologic log the first time it is used or listed at the bottom the log. Loggers are cautioned
to limit the use of abbreviations to avoid a lithologic log that is cryptic.

5.2.1 PROTOCOLS FOR LITHOLOGIC DESCRIPTION OF DISCRETE SOIL OR ROCK CORES

This section describes the protocols for completing a lithologic description based on discrete soil or rock core samples. For instance, in a 5-foot soil core, the dominant lithology may be sand that is interrupted by several thin beds of another lithology such as clay. This section description can be simplified by writing: 5-10 bgs = sand (with other descriptors) except as noted; 7-8 foot clay zone (with descriptors); 8-9 foot pebble zone (with descriptors); etc. This also aids in “seeing” the thickest unit designations possible for use in modeling.

Description of Unconsolidated Material

Unconsolidated material comprises the majority of the subsurface interval for the Phase 3 investigation. The shallow subsurface is very important to the chemical characterization because of infiltration and migration. Soils are to be described as unconsolidated material and will include:

- Name of sediment (sand, silt, clay, etc.)
- Grain size and distribution
- Composition of larger-grained sediments
- Degree of consolidation and cementation
- Moisture content
- Density

- Color (per Munsell color chart)
- Description of contacts

In accordance with the USCS on naming unconsolidated sediment, the particle size with the highest percentage is the root name. When additional grains are present in excess of 15 percent, the root name is modified by adding a term in front of the root name. For instance, if a material is 80 percent sand and 20 percent gravel, then it is gravelly sand. If the subordinate grains comprise less than 15 percent but greater than 5 percent, the name is written:_____ (dominant grain) with:_____ (subordinate grain). For example, a soil with 90 percent sand and 10 percent silt would be named a sand with silt. If a soil contains greater than 15 percent of four particle sizes, then the name is comprised of the dominant grain size as the root name and modifiers as added before. For example, if a material is 60 percent sand, 20 percent silt, and 20 percent clay the name would be a silty clayey sand. If a material is 70 percent sand, 20 percent silt, and 10 percent clay, it would be a silty sand with clay. When large cobbles or boulders are present, their percentage shall be estimated, and their mineralogy recorded.

6.0 PHOTO DOCUMENTATION

Photo documentation of the site, soil cuttings and samples will be conducted when requested by the client or on-site geologist. Photographs will be used to document sediment type, grain size, and color. Photos will be collected with a digital camera or cell phone is approved. These photos will be logged in and uploaded to a photograph database or file for viewing by all parties associated with the drilling operation. These photos are intended to compliment soil evaluation/lab analysis and are not intended to take the place lab evaluation of the soil.

7.0 RESTRICTIONS/LIMITATIONS

Only geologists, or similarly qualified persons trained in lithologic description, are qualified to perform the duties described in this SOP. MCAS Yuma Environmental will have the authority to decide whether an individual is qualified

8.0 REFERENCES

ASTM 2488-06 Standard Practice for Description and Identification of Soils – Visual Manual Procedure

9.0 ATTACHMENTS

Note: These Attachments are for informational purposes. Other equivalent charts such as USCS or logs may be used.

Attachment A - Lithologic Logs
Attachment B - Common Abbreviations for Lithologic Logging
Attachment C - Naming of Unconsolidated Materials
Attachment D - Example of Unified Soil Classification System (USCS)

Attachment A: Lithologic Log

Attachment B: Common Abbreviations

Common Abbreviations		
Abundant – abnt	Diameter – dia	Laminated – lam
Amount – amt	Different – diff	Maximum – max
Approximate – approx	Disseminated – dissem	Pebble – pbl
Arenaceous – aren	Elevation – elev	Phenocryst – phen
Argillaceous – arg	Equivalent – equiv	Porphyritic – proph
Average – ave	Foliated – fol	Probable – prob
Bedded – bdd	Formation – frm	Quartz – qrz
Bedding – bdg	Fracture – frac	Regular – reg
Calcareous – calc	Fragmental – frag	Rocks – rx
Cemented – cmt	Granular – gran	Rounded – rnd
Cobble – cbl	Gypsiferous – gyp	Saturated – sat
Contact – ctc	Horizontal – hriz	Secondary – sec
Cross-bedded – xbdd	Igneous – ign	Siliceous – sil
Cross-bedding – xbdg	Inclusion – incl	Structure – struc
Cross-laminated – xlam	Interbedded – intbdd	Unconformity – uncnf
Crystal – xl	Irregular – ireg	Variegated – vrgt
Crystalline – xln	Joint – jnt	Vein – vn
Grain Size	**Contacts**	**Sorting**
grain – gn	gradational – grad	poor – pr
fine – f	erosional – er	moderate – mod
very fine – vf	abrupt – ab	well – well
medium – med		
coarse – crs	**Fabric**	
large – lg	grain supported – gs	
very large – vlg	matrix supported – ms	
small – sm	imbricate – im	

Attachment C: Naming of Unconsolidated Materials

Main Particle	Gravel	Sand	Silt	Clay
> 15 % gravel	Gravel	Gravelly sand	Gravelly silt	Gravelly clay
> 15 % sand	Sandy gravel	Sand	Sandy silt	Sandy clay
> 15 % silt	Silty gravel	Silty sand	Silt	Silty clay
> 15 % clay	Clayey gravel	Clayey sand	Clayey silt	Clay
5-15 % gravel	Not applicable	Sand with gravel	Silt with gravel	Clay with gravel
5-15 % sand	Gravel with sand	Not applicable	Silt with sand	Clay with sand
5-15 % silt	Gravel with silt	Sand with silt	Not applicable	Clay with silt
5-15 % clay	Gravel with clay	Sand with clay	Silt with clay	Not applicable
> 15% gravel plus 15% sand	Sandy gravel	Gravelly sand	Gravelly sandy silt	Gravelly sandy clay
> 15% gravel plus 15% silt	Silty gravel	Gravelly silty sand	Gravelly silt	Gravelly silty clay
> 15% gravel plus 15% clay	Clayey gravel	Gravelly clayey sand	Gravelly sandy silt	Gravelly clay
> 15% sand plus 15% silt	Silty sandy ravel	Silty sand	Sandy silt	Sandy silty clay
> 15% sand plus 15% clay	Sandy clayey gravel	Clayey sand	Sandy clayey silt	Sandy clay
> 15% silt plus 15% clay	Silty clayey gravel	Silty clayey sand	Clayey silt	Silty clay
Note: Other combinations are possible when all particle sizes are present in greater than 15%. For example, a silty clayey gravelly sand. Other possible combinations exist such as a gravelly sand with silt.				

Compton, R.R., *Manual of Field Geology*, 1962.

Attachment D: Example of Unified Soil Classification System (USCS)

Summary of USCS Field Identification Tests

Coarse-Grained Soils **More than half the material (by weight) is individual grains visible to the naked eye.**	**Gravelly Soils** More than half of coarse fraction is larger than 4.75 mm.		**Clean Gravels** Will not leave a stain on a wet palm	Substantial amounts of all grain particle size			GW
				Predominantly one size or range of sizes with some intermediate sizes missing			GP
			Dirty Gravels Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)			GM
				Plastic fines (to identify, see CL below)			GC
	Sandy Soils More than half of coarse fraction is smaller than 4.75 mm.		**Clean Sands** Will not leave a stain on a wet palm	Wide range in grain size and substantial amounts of all grain particle sizes			SW
				Predominantly one size or a range of sizes with some intermediate sizes missing			SP
			Dirty Sands Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)			SM
				Plastic fines (to identify, see CL below)			SC
Fine-Grained Soils **More than half the material (by weight) is individual grains not visible to the naked eye.** **(<0.074 mm)**	**Ribbon**	**Liquid Limit**	**Dry Crushing Strength**	**Dilatancy**	**Toughness**	**Stickiness**	
	None	<50	None to Slight	Rapid	Low	None	ML
	Weak	<50	Medium to High	None to Very Slow	Medium to High	Medium	CL
	Strong	>50	Slight to Medium	Slow to None	Medium	Low	MH
	Very Strong	>50	High to Very High	None	High	Very High	CH
Highly Organic Soils	Readily identified by color, odor, spongy feel, and frequently by fibrous texture						OL OH Pt

SOP 07

SUBSURFACE SOIL SAMPLING

1.0 OBJECTIVE

The objective of this standard operating procedure (SOP) is to define the techniques and requirements of the contractor employees for collecting soil samples from the unconsolidated zone. Techniques include use of hand augers, Shelby tubes, continuous core samples, split spoon samplers and direct push technology (DPT) drill rig or Geoprobe®.

2.0 BACKGROUND

2.1 Definitions

Drill Rig – A mobile mechanical device used to drill soil boring(s) (borehole[s]) to reach the subsurface to collect soil samples.

Unconsolidated Zone – The layer of soil above bedrock that exists in a relatively loose state

Hand Auger – A stainless steel cylinder (bucket) approximately 7 to 10 centimeters (cm) (3 to 4 inches) in diameter and 30 cm (1 foot) in length, open at both ends with the bottom edge designed to twist into the soil and cut out a soil core. The bucket collects the soil sample. The auger has a T-shaped handle (for hand operation) attached to the top of the bucket by a stainless steel rod(s).

Shelby Tube – A cylindrical sampling device, generally made of steel, that is driven into the subsurface soil through the hollow-stem auger. The tube, once retrieved, may be copped and the undisturbed soil sample extruded in the laboratory prior to analysis.

Split-Spoon/Split-Barrel Sampler – A cylindrical sampling device generally made of carbon steel that fits into a hollow-stem auger. The spoon is hinged lengthwise, which allows the sample to be retrieved by opening (“splitting”) the spoon.

Slide Hammer – A device consisting of a drive weight (hammer) and a drive weight fall guide.

Subsurface Soil – The soil that exists deeper than approximately 30 cm (1 foot) from the surface, but above bedrock or any other consolidated material.

Grab Sample – A discrete portion or aliquot taken from a specific location at a given point in time.

Liner – A cylindrical sampling device, generally made of brass, stainless steel, or Teflon® that is placed inside a split-spoon or hand auger bucket to collect undisturbed samples.

Composite Sample – Two or more sub-samples taken from a specific media and location or site at a specific point in time. The sub-samples are collected and mixed (homogenized), and then one single average sample is collected from the mixture.

Auger Flight – A steel section length attached to an auger to extend the auger and remove unconsolidated material as coring depth increases.

DPT Drill Rig (Geoprobe®) - A hydraulically operated, hammer device installed in the back of a van or pickup truck, used to advance a hollow-stem rod into the soil for the purpose of collecting soil, soil gas, or groundwater samples.

2.2 Discussion

Shallow subsurface soil samples (to depths between 0.15 cm to 3 meters (m) [6 inches and 10 feet]) may be collected using hand augers. However, soil samples collected with a hand auger are commonly of poorer quality than those collected by split-spoon/ split-barrel or Shelby tube samplers since the soil sample is disturbed in the augering process. Split-spoon/ split barrel and Shelby tube liners are generally used during collection of soil samples using a hollow-stem auger, but may also be used to collect undisturbed soil samples from hand auger borings using a slide-hammer device. Liners are used to minimize the loss of volatile organic compounds (VOCs). The size and construction material of sampling devices should be selected based on project and analytical objectives and defined in site-specific plans.

2.3 Associated Procedures

SOP 1 – Sample Custody
SOP 2 – Packaging and Shipping Environmental Samples
SOP 3 – Field Logbook Content and Control
SOP 4 – Field Equipment Decontamination

3.0 RESPONSIBILITIES

Site Manager – The site manager is responsible for ensuring that field personnel are trained in the use of this procedure and the required equipment, and for ensuring that subsurface soil samples are collected in accordance with this procedure and any other SOPs pertaining to specific media sampling. The site manager must also ensure that the quantity and location of subsurface soil samples collected meet the requirements of the site-specific plans.

Field Team Leader – The field team leader is responsible for ensuring that field personnel collect subsurface soil samples in accordance with this SOP and other relevant procedures.

4.0 REQUIRED EQUIPMENT

4.1 General

- Weighted cloth measuring tape
- Water level meter (if applicable)
- Site-specific plans
- Field logbook
- Indelible black ink pens and markers
- Labels and appropriate forms/ documentation for sample shipment
- Clear, waterproof tape
- Appropriate sample containers
- Insulated cooler(s)
- Ice bags or “blue ice”
- Nitrile, Latex or equivalent sampling gloves
- Plastic sealable bags (ziploc™)
- Personal protective clothing and equipment
- Stainless steel and/or Teflon®-lined equipment
- Plastic sheeting
- Decontamination supplies

Additional equipment is discussed in Section 5.2.5, Field Sampling/Preservation Methods.

4.2 Manual (Hand) Augering

- T-handle
- Hand auger: hand auger cylinder bucket-, tube-type auger as required by the site-specific plans
- Extension rods
- Rubber hammer
- Wrench(es), pliers

4.3 Split-Spoon/Split-Barrel and Shelby Tube Sampling

- Drill rig equipped with a 63-kilogram (kg) (104-lb) drop hammer and sufficient hollow-stem augers to drill to the depths required by the Work Plan, Sampling and Analysis Plan (SAP), or site-specific plans.
- Sufficient numbers of split spoon/split-barrel or Shelby tube samples so that at least one is always decontaminated and available for sampling. Three split-spoon/split-barrel or Shelby tube samples are generally the minimum necessary. (Shelby tubes are usually used only once.)
- Split-spoon liners (as appropriate).
- Wrench(es), hammer, large flat head screw driver, other appropriate tools.

4.4 DPT Drilling (Geoprobe®)

- Extruder rack and piston (if soil is to be extruded into a sample container – otherwise, the steel sample tube with the Standard and Kansas Samplers or acetate liner with the Large Bore Sampler may be shipped to the laboratory, as indicated in the site-specific plans).
- Assembled soil samplers (i.e., Standard 10-inch or 24-inch Sampler, Kansas Stainless Sampler, or Large Bore Sampler – refer to the Geoprobe® Systems Equipment and Tools Catalog for specific parts for each sampler.

5.0 PROCEDURES

5.1 Utility Clearance

1. Review site plans and aerial photographs of the investigation area.

2. Perform a site visit and conduct markouts of proposed soil boring locations. Mark each location with white marking paint or with a pin flag.

3. Contact Underground Surface Alert (USA) DigAlert, Arizona Blue Stake, or the equivalent state operated underground service alert utility service within two business days of anticipated drilling activities. Obtain dig tickets and keep on file.

4. If the project is for a federal client (Navy, Marines, Army, Air Force), obtain a dig permit through the appropriate public works office at the installation.

5. If the project budget allows, arrange for utility clearance (geophysical survey) provided by a contractor, as another safe guard toward utility clearance / avoidance.

6. If any location is within three lateral feet from any suspected utility, reposition the proposed soil boring accordingly.

5.2 Preparation

7. Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.

8. Locate sampling location(s) in accordance with the Work Plan, SAP, or project document(s).

9. Discuss sample depths or intervals with the drilling operator and keep a weighted measuring tape at the ready (decontaminated).

10. Clear away vegetation and debris from the ground surface at the boring location.

11. Prepare an area next to the sample collection location for laying out cuttings by placing plastic sheeting on the ground to cover immediate area surrounding the borehole. In cases where samplers are retrieved from the borehole (split spoon or Shelby tube) and must be placed on a surface for soil lithology logging and or sample collection, place sampling devices on a foldable table covered by decontaminated visqueen sheeting.

12. Set up a three stage decontamination station, if decontamination is required, in accordance with SOP-4. For sites requiring decontamination between samples, the first two buckets shall be comprised of tap water. The third bucket shall be comprised of distilled water. Alconox or liquinox shall be added to the first bucket. Decontamination water should be changed out daily, or in accordance with the Work Plan, SAP, or site specific plan.

5.2 Collection

The following general steps must be followed when collecting all subsurface soil samples:

1. VOC samples or samples that may be degraded by aeration shall be collected first and with the least disturbance possible.

2. Sampling information, including lithologic descriptions, shall be recorded in the field logbook and on any associated forms.

3. Specific sampling devices to be used shall be identified in the site-specific plans and recorded in the field logbook.

4. Care must be taken to prevent cross-contamination and misidentification of samples. Disposable gloves shall be changed out between samples.

5. Sample containers containing samples for VOC analysis should be filled completely to minimize headspace.

5.2.1 Manual (Hand) Augering

The following steps must be followed when collecting hand auger samples:

1. Advancing hand auger soil borings is also a way of using “hand tools” as part of utility clearance. Advancing any soil boring by hand auger to 5 feet below ground surface (bgs) is considered the standard practice before drilling using mechanized equipment to a deeper total depth.

2. Hand auger to the depth required for sampling. Place cuttings on plastic sheeting or as specified in the site-specific plans. If possible, lay out the cuttings in stratigraphic order.

3. Throughout the augering, make detailed notes concerning the geologic features of the soil or sediments in the field logbook or soil boring log form.

4. Cease augering when the top of the specified sampling depth has been reached. If required remove the auger from the hole and decontaminate the auger or use a separate decontaminated auger, then obtain the sample.

5. Collect a grab sample for VOC analyses (or samples that may be degraded by aeration) immediately and place in sample container. Sample bottles should be filled completely to minimize headspace.
6. Remaining sample should be homogenized for other analyses prior to placing samples in the appropriate containers. Label containers as required.

7. Wipe containers with a clean Kimwipe or paper towel to remove residual soil from the exterior of the container(s).

8. Label the sample container with the appropriate information.

9. Place the containers in a sealable (Ziploc™) plastic bag and seal the bag. Pack samples in a cooler with ice.

10. Proceed with further sampling, as required by the Work Plan, SAP, or site-specific plans.

11. When all sampling is complete, dispose of cuttings, plastic sheeting, etc. as specified in the Work Plan, SAP, or site-specific plans.

12. Complete the field logbook entry and other appropriate forms being sure to record all relevant documentation. Remand custody of samples to the appropriate personnel.

5.2.2 Split-Spoon/Split-Barrel Sampling

Note: Steps 1 through 12 describe activities to be performed by a licensed drilling contractor, not the contractors personnel.

The following steps must be followed when collecting split-spoon samples:

1. Remove any pavement and sub-base material from an area of twice the bit diameter, if necessary.

2. Advance the soil boring by hand auger to a minimum of 5 feet bgs prior to advancing the soil boring by drill rig. The hand auger bucket should be as close to the diameter of the down-hole drilling equipment as possible.

3. The drilling rig will be decontaminated at a separate location prior to drilling, per SOP 04, or the site-specific decontamination procedures.

4. Attach the hollow-stem auger with the cutting head, plug, and center rod(s) to the drill rig.

5. Begin drilling and proceed to the first designated sample depth, adding auger(s) as necessary.

6. Upon reaching the designated sample depth, slightly raise the auger(s) to disengage the cutting head, and rotate the auger without advancement to clean cuttings from the bottom of the hole

7. Remove the plug and center rods.

8. If required by the site-specific sampling plan, install decontaminated liners in the split spoon/split barrel sampler.

9. Install a decontaminated split-spoon on the center rod(s) and insert it into the hollow-stem auger. Connect the hammer assembly and lightly tap the rods to seat the drive shoe at the top of undisturbed soil or sediment.

10. Mark the center rod in 15-cm (6-inch) increments from the top of the auger(s).

11. Drive the split-spoon using the hammer. Use full 75-cm (30-inch) drop as specified by the American Society of Testing and Material (ASTM) Method D-1586. Record the number of blows required to drive the spoon or tube through each 15-cm (6-inch) increment.

12. Cease driving when the full length of the spoon has been driven or upon refusal. Refusal occurs when little or no progress is made for 50 blows of the hammer. ASTM D1586-99 (Sections 7.2.1 and 7.2.2 defines “refusal” as >50 blows per 6-inch advance or a total of 100 blows

13. Pull the split-spoon free by using upswings of the hammer to loosen the sampler. Pull out the center rod and split-spoon.

14. Unscrew the split-spoon assembly from the center rod and place it on the plastic sheeting.

15. Remove the drive shoe and head assembly. If necessary, tap the split spoon assembly with a hammer to loosen threaded couplings.

16. With the drive shoe and head assembly off, open (split) the split-spoon, being careful not to disturb the sample.

17. Label sample containers with appropriate information. If liners were used, immediately install Teflon® tape over the ends of the liners, cap the liners, and seal

the caps over the ends of the liner with waterproof tape. Label the samples as required by the site specific plans. Mark the top and bottom of each sample on the outside of each liner. Indicate boring/well number and depth on the outside of the liner, as required.

18. If VOC analyses are to be conducted on the soil sample and liners were not used, place that sample in its sample container immediately after opening the split-spoon, filling the sample bottle completely. Seal the container immediately, then describe it in the field logbook and/ or associated forms. Record the sample identification number, depth from which the sample was taken, and the analyses to be performed on the samples in the field logbook, appropriate forms and on the chain of custody.

19. Remaining sample should be homogenized prior to placing samples in appropriate containers.

20. Wipe containers with a clean Kimwipe or paper towel. Label containers as required when liners are not used.

21. Place containers and/or sealed liners in a sealable (Ziploc™) plastic bag and seal the bag . Pack samples in a chilled cooler.

22. In the field logbook and on the soil boring log form, describe sample lithology by observing cuttings and/or the bottom of the liner.

23. Continue to advance the borehole to the next sampling point. Collect samples as outlined above.

24. When sampling is complete, remove the drilling rig to the heavy equipment decontamination area.

25. Dispose of cuttings, plastic sheeting, etc., as specified in the Work Plan, SAP, or site-specific plans. Backfill bore hole as specified in the Work Plan, SAP, or project-specific plans.

26. Decontaminate split-spoons and other small sampling equipment according to SOP 04, before proceeding to other sampling locations or sampling intervals.

27. Complete the field logbook entry and other form, being sure to record all relevant information before leaving the site.

28. Properly package all samples for shipment to laboratories and complete all necessary sample shipment documentation. Remand custody of the samples to the appropriate personnel.

5.2.3 DPT Drilling (Geoprobe®) Sampling

1. Advance the soil boring by hand auger to a minimum of 5 feet bgs prior to advancing the soil boring by drill rig. The hand auger bucket should be as close to the diameter of the down-hole drilling equipment as possible.

2. Assemble the sampling device as follows:

a. Screw the cutting shoe to the bottom end of the sample tube (unless using standard probe drive sampler which has built-in cutting edge).
b. Screw the piston tip onto the piston rod.
c. Screw the drive head onto the top end of the sample tube.
d. If using Teflon® liner, insert liner into sample tube.
e. Slide the piston rod into the sample tube, leaving the piston tip sticking out of bottom end of the sample tube.
f. Screw the piston stop pin onto the top end of the piston rod in a counter-clockwise direction.

3. Attached the assembled sampler onto the leading probe rod. A 12-inch probe rod is recommended to start the 24-inch standard and large bore samplers.

4. Thread the drive cap onto the top of the probe rod and advance the sampler. Replace the 12-inch rod with a 36-inch rod as soon as the top of the sampler is driven to within 6 inches of the ground surface.

5. Advance the sampler to the interval to be sampled using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.

6. Move the probe unit back from the top of the probe rods and remove the drive cap.

7. Lower the extension rods into the inside diameter of the probe rods using extension rod couplers to join the extension rods.

8. Attach the extension rod handle to the top extension rod and rotate the handle clockwise until the leading extension rod is screwed into the piston stop pin. Continue to rotate the handle clockwise until the stop pin disengages from the drive head.

9. Remove the extension rods and attached piston stop pin from the probe rods.

10. Replace the drive cap, mark the top probe rod with a marker or tape at a distance above the ground equal to the length of the sample tube (either 12 or 24 inches).

11. Advance the probe rods using the hydraulic hammer to the length of the sample tube (either 12 or 24 inches).

12. Replace the drive cap with the pull cap and retract the probe rod(s). Secure the rod(s) with a clamp or by hand during removal so they do not fall back down the resulting borehole.

13. Detach the sampler from the lead probe rod, verifying the sufficient sample volume was recovered (the length of sample contained within the tube is approximately equal to the length of exposed piston rod).

14. Disassemble the sample. If the sample is to be analyzed for VOCs, then the sample tube or liner should be sealed immediately by placing a Teflon® septa over the ends and covering them with plastic caps.

15. If samples do not require VOC analysis, they may be extruded from the sampler and transferred to the sample jars specified in the Work Plan, SAP, site-specific plans, or

SOPs 2 “Packaging and Shipping of Environmental Samples”. Samples can be extruded by one of two methods:

a. Using a DPT drill rig or Geoprobe® rig and the extruder rack, position the extruder rack on the foot of the Geoprobe® derrick; insert the sample tube into the extruder rack with cutting end up; and position the extruder piston, pushing the sample out of the sample tube using the (probe) function. Catch the sample as it exits beneath the extruder in a sample jar or stainless steel mixing bowl. Samples to be collected for VOCs will be collected directly from the sample tube into the sample jars.
b. Lightly tap the side of the sample tube with a hammer while also lightly pushing the Piston Rod.

16. Label the sample liner or sample jars as required, securing the label by covering it with a piece of clear, waterproof tape.

17. Homogenize the sample in a stainless steel bowl with a stainless steel spoon or spatula. Transfer the sample from the bowl to the sample container.

18. Clean the outside of the sample jars and place individual samples into sealable bags and seal closure.

19. Place samples in a cooler containing ice.

5.3 Field Sampling/Preservation Methods

The following three sections contain SW 846 Methods for sampling and field preservation. These methods include EN CORE Sampler method for low-level limits, En CORE Sampler Method for high-level limits/ screening, and methanol preservation. These methods may be used if required by the EPA Region, client, or governing sample plan. These methods are very detailed and contain equipment requirements at the beginning of each section.

When collecting soil samples using the EN CORE Sampler Method, collection of soil for moisture content analysis is required. Results of this analysis are used to adjust “wet” concentration results to “dry” concentrations to meet analytical method requirements.

Note: Some variations from these methods, (e.g., sample volume) may be required depending on the contracted analytical laboratory.

5.3.1 EN CORE Sampler Collection for Low Level Analyses (≥ 1ug/kg)

5.3.1.1 EN CORE Sampling Equipment Requirements

The following equipment is required for low-level analysis:

- Three 5 gram (g) samplers

Note: The sample volume requirements specified are general requirements. Actual sample volume and/or container sizes may vary depending on client or laboratory requirements.

- One 110 –milliliter (mL0 (4-ounce [oz]) widemouth glass jar or applicable container for moisture analysis
- One T-Handle
- Paper Towels

5.3.1.2 EN CORE Sampling Steps for Low Level Analysis

1. Remove sampler and cap from package and attach T-handle to sampler body.

2. Quickly push the sampler into a freshly exposed surface of soil until the sampler is full. The O-ring will be visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

3. Extract sampler and wipe the sampler head with a paper towel so that the cap can be tightly attached.

4. Push cap on with a twisting motion to secure to the sampler body.

5. Rotate the sampler stem counterclockwise until stem locks in place to retain sample within the sampler body.

6. Fill out sample label and attach to sampler.

7. Repeat procedure for the remaining two samplers.

8. Collect moisture sample in 110-mL (4-oz) wide-mouth jar using a clean stainless steel spoon or trowel.

9. Store samplers at 4-degrees (^{0}) Celsius (C), ± 2^0 C. Samples must be shipped and delivered to the analytical laboratory for extraction with 48 hours.

Note: Verify requirements for extraction/holding times.

5.3.2 EN CORE Sampler Collection for High level Analyses (≥200 ug/kg)

5.3.2.1 EN CORE Sampling Equipment Requirements

The following equipment is required for high-level analysis:

- One 5-g sampler or one 25-g sampler (The sampler size used will be dependent on client and laboratory requirements.
- One 110-mL (4 oz) wide-mouth glass jar or applicable container specified for moisture analysis.
- One T-handle.
- Paper towels

5.3.2.2 EN CORE Sampling Steps for High Level Analysis

1. Remove sample and cap from package and attach T-Handle to sampler body.

2. Quickly push the sampler into a freshly exposed surface of soil until the sampler is full. The O-ring will be visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

3. Extract sampler and wipe the sampler head with a paper towel so that the cap can be tightly attached.

4. Push cap on with a twisting motion to secure to the sampler body.

5. Rotate the sampler stem counterclockwise until stem locks in place to retain sample within the sampler body.

6. Fill out sample label and attach to sampler.

7. Collect moisture sample in 110-mL (4-oz) wide-mouth jar using a clean stainless steel spoon or trowel.

8. Store samplers at 4-degrees (^{0}) Celsius (C), ± 2^0 C. Samples must be shipped and delivered to the analytical laboratory for extraction with 48 hours.

Note: Verify requirements for extraction/holding times.

5.3.3 Methanol Preservation Sampling

5.3.3.1 Methanol Preservation Sampling Equipment Requirements

- One pre-weighed jar that contains methanol or a pre-weighed empty jar accompanied with a pre-weighed vial that contains methanol (laboratory grade)
- One dry weight cup
- Weighing balance that accurately weighs to 0.01 g (with accuracy of ± 0.01g)
- Set of balance weights used in daily balance calibration
- Latex gloves
- Paper towels
- Cutoff plastic syringe or other coring device to deliver 5 g or 25 g of soil

5.3.3.2 Sampling Preservation Steps

1. Wear gloves during all handling of pre-weighed vials.

2. Weigh the vial containing methanol preservative to the nearest 0.01 g. If the weight of the vial with methanol varies by more than 0.01 g from the original weight recorded on the vial, discard the vial. If the weight is within tolerance, it can be used for soil preservation/ collection below.

3. Quickly collect a 5-g or 25 g sample using a cutoff plastic syringe or other coring device designed to deliver 5-g or 25-g of soil from a freshly exposed surface of soil. The 5-g or 25-g size is used is dependent on client and laboratory requirements.

4. Carefully wipe the exterior of the collection device with a clean paper towel.

5. Quickly transfer the soil to an empty jar or a jar that contains methanol. If extruding into a jar that contains methanol, be careful not to splash the methanol outside of the vial. Again, the type of jar used is dependent on the client or laboratory requirements.

6. If the jar used to collect the soil plug was empty before the soil was added, immediately preserve with the methanol provided using only one vial of methanol preservative per sample jar.

7. Using the paper toweling, remove any soil off of the vial threads and cap the jar.

8. Weigh the jar with the soil in it to the nearest 0.01-g and record the weight on the sample label.

9. Collect dry weight sample using a clean stainless steel spoon or trowel.

10. Collect dry weight sample using a clean stainless steel spoon or trowel.

11. Store samples at 4^0, $\pm 2^0$ C.

12. Ship sample containers with plenty of ice in accordance with the Department of Transportation (DOT) regulations (CORROSIVE, FLAMMABLE LIQUID, POISON) to the laboratory

6.0 RESTRICTIONS/LIMITIATIONS

Basket or spring retainers may be needed for split-spoon sampling in loose, sandy soils.

Shelby tubes may not retain the sample in loose, sandy soils.

7.0 REFERENCES

American Society for Testing and Materials, *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils,* Standard Method D1586-99, 1999

U.S. Department of Energy, Hazardous Waste Remedial Actions Programs, *Quality Control Requirements for Field Methods*, DOE/HWP-69/R2, September 1996

U.S. Department of Energy, Hazardous Waste Remedial Actions Program, *Standard Operating Procedures for Site Characterizations,* DOE/HWP-100/R1, September 1996 or current revision.

U.S. Environmental Protection Agency, *Test Methods for evaluating Solid Waste, Physical/Chemical Methods (SW-846)* Third Edition, November 1986 (as amended by Updates I,II, IIA, IIB, III, and IIIA, June 1997) Method 5035 (**Note:** § 6.2.1.8 of this method says samples stored in En Core samplers should be analyzed within 48 hours or transferred to soil sample vials in the laboratory with 48 hours); December 1996, Revision O Closed-System Purge-and Trap and Extraction for Volatile Organics in Soil and Waste Samples.

Geoporbe Systems, *The Probe-Drive Soil Sampling System*, September 1991.

Geoporbe Systems, *Equipment and Tools Catalog*, 1992.

SOP 10

DECONTAMINATION OF FIELD EQUIPMENT

1.0 Objective

The objective of this standard operating procedure (SOP) is to describe the general procedures required of the contractors employees for decontamination of field equipment at non-radioactive sites. This SOP serves as a guide and is applicable at most contaminated sites: however, it should be noted that site-specific conditions (i.e. type of contamination, type of media sampled) and the governing agency (i.e. United States Environmental Protection Agency [USEPA], Arizona Department of Environmental Quality [ADEQ], or Department of Energy [DOE]) may require modifications to the decontamination procedures provided in this SOP.

2.0 Background

2.1 Definitions

Analyte- Free Water- Tap water that has been treated so that the water contains no detectable heavy metals or other inorganic compounds. Analyte-free water should be stored only in clean glass, stainless steel, or plastic containers that can be closed when not in use.

Clean– Free of visible contamination and when decontamination has been completed in accordance with this SOP.

Cross Contamination- The transfer of contaminants through equipment or personnel from the contamination source to less contaminated or non-contaminated samples or areas.

Decontamination- The process of rinsing or otherwise cleaning the surfaces of equipment to rid them of contaminants and to minimize the potential for cross contamination of samples or exposure of personnel.

Organic-Free/Analyte-Free Water – Tap water that has been treated so that the water meets the analyte-free water criteria and contains no detectable organic compounds. Organic-free/analyte-free water should be stored only in clean glass, Teflon, or stainless steel containers that can be closed when not in use.

Potable Water- Tap water may be obtained from any municipal system. Chemical analysis of the water source may be required before it is used.

Soap – Low-sudsing, non-phosphate detergent such as Liquinox ™ and Alconox.

2.2 Discussion

Decontamination of field equipment is necessary to ensure acceptable quality of samples by preventing cross contamination. Further, decontamination reduces health hazards and prevents the spread of contaminants offsite.

3.0 Responsibilities

Field Team Leader – The field team leader (FTL) ensures that the field personnel are trained in the performance of this procedure and that decontamination is conducted in accordance with this procedure. The FTL may also be required to collect an document rinsate samples to provide quantitative verification that these procedures have been correctly implemented.

4.0 Required Supplies

- Stiff-bristle scrub brushes
- Plastic buckets, lids and troughs
- Soap, Liquinox ™
- Nalgene or Teflon sprayers or wash bottles or 2 to 5 gallon, manual-pump sprayer (pump sprayer material must be compatible with the solution used)
- Plastic sheeting
- Disposable wipes, rags, or paper towels
- Potable water
- Analyte-free water
- Organic-free/analyte free water
- Gloves, safety glasses and other protective clothing as specified in the site-specific health and safety plan
- High-pressure pump with soap dispenser or steam-spray unit (for large equipment only)
- Tools for equipment assembly and disassembly (as required)

5.0 Procedures

All reusable equipment (non-dedicated) used to collect handle, or measure samples will be decontaminated before coming into contact with any sample. Decontamination of equipment will occur either at a central decontamination station or at portable decontamination stations set up at the sampling location, drill site, or monitoring well location. The centrally located decontamination station will include an appropriately sized bermed and lined area on which equipment decontamination will occur and shall be equipped with a collection system and storage vessels. In certain circumstances, berming is not required when small quantities of water are being generated and for some short duration field activities. Equipment should be transported to the decontamination station in a manner to prevent cross-contamination of equipment and/or area. Precautions taken may include enclosing augers or rods in plastic wrap while being transported on a flatbed truck.

The decontamination area will be constructed so that contaminated water is either collected directly into appropriate containers (5-gallon buckets or steel wash tubs) or within the berms of the decontamination area that then drains into a collection system. Water from the collection system will be transferred into 55 gallon drums or portable tanks for storage. Typically, decontamination rinse water will be staged until sampling results or waste characterization results are

obtained, evaluated and the proper disposal of the waste is determined. The exact procedure for decontamination waste disposal should be discussed in the project specific Work Plan or Sampling and Analysis Plan (SAP).

All items that will come into contact with potentially contaminated media will be decontaminated before use and between sampling and/or drilling locations. If decontaminated items are not immediately used, they will be covered either with clean plastic or aluminum foil depending on the size of the item. All decontamination procedures for the equipment being used are as follows.

General Guidelines

- Potable, analyte-free, and organic free/analyte free water should be free of all contaminants of concern. Following the field plan, analytical data from the water source may be required.

- Decontaminated equipment will be allowed to air dry before being used.

- Documentation for all cleaning will be recorded in the logbook.

- Gloves, boots, safety glasses, and any other personnel protective clothing and equipment will be used as specified in the site-specific health and safety plan.

5.1 Heavy Equipment Decontamination

Heavy equipment includes drilling rigs and backhoes. Follow these steps when decontaminating this equipment:

- Establish a bermed decontamination area that is large enough to fully contain the equipment to be cleaned. If available, an existing wash pad or appropriate paved and bermed area may be used; otherwise, use one or more layers of heavy plastic sheeting to cover the ground surface and berms. All decontamination pads should be upwind of the area under investigation.

- With the rig/equipment in place, spray areas exposed to contaminated material (soils) using a hot water high-pressure sprayer. Be sure to spray down all surfaces, including the undercarriage.

- Use brushes, soap, and potable water to remove dirt whenever necessary.

- Remove equipment from the decontamination pad and allow it to air dry before returning it to the work site.

- Record the equipment type, date, and time and method decontamination in the appropriate logbook.

- After decontamination activities are completed, collect all contaminated wastewater, plastic sheeting, and disposable gloves, boots, and clothing in

separate containers or receptacles. All receptacles containing contaminated items must be properly labeled for disposal as detailed in the Work Plan or SAP. Liquids and solids must be drummed separately.

5.2 Downhole Equipment Decontamination

Downhole equipment includes hollow-stem augers. Drill pipes, rods, stems, etc. Follow these steps when decontaminating this equipment:

- Set up a centralized decontamination area, if possible. This area should be set up to collect contaminated rinse waters and to minimize the spread of airborne spray.

- Set up a “clean” area upwind of the decontamination area to receive cleaned equipment for air-drying. At a minimum clean plastic sheeting must be used to cover the ground, tables, or other surfaces on which decontaminated equipment is to be placed. All decontamination pads should be upwind of any areas under investigation.

5.3 Sampling Equipment Decontamination

- Set up a decontamination line on plastic sheeting. The decontamination line should progress from “dirty” to “clean”. A clean area shall be established upwind of the decontamination wash/rinse activities to dry the equipment. At a minimum, clean plastic sheeting must be used to cover the ground, table, or other surfaces that the decontaminated equipment is placed for drying.

- Disassemble any items that may trap contaminants internally. Do not reassemble the items until decontamination and air drying are complete.

- Wash the items with potable water and soap using a stiff brush as necessary to remove particulate matter and surface films. The items may be steam cleaned using soap and hot water as an alternative to brushing. Note that polyvinyl chloride or plastic items should not be steam cleaned. Items that have come into contact with concentrated and/or oily contaminants may need to be rinsed with a solvent such as hexane and allowed to air dry prior to the washing step.

- Thoroughly rinse the items with potable water.

- If sampling for metals, thoroughly rinse the items with an acid solution (e.g., 10 percent nitric acid) followed by a rinse using analyte-free water. If sampling for organic compounds, thoroughly rinse the items with solvent (e.g., isopropanol) followed by a rinse using analyte-free water. The specific chemicals used for the acid rinse and solvent rinse phases should be specified in the work plan. The acid rinsate and solvent rinsate must each be containerized separately. Acids and solvents are potentially hazardous materials and care must be exercised when using these chemicals to prevent adverse health affects (e.g., skin burns, irritation to the eyes and respiratory

system, etc.). Appropriate personal protective equipment must be worn when using these chemicals. These chemicals (including spent rinsate) must be managed and stored appropriately. Special measures such as proper labels, paperwork, notification, etc. may be required when transporting of shipping these chemicals.

- Rinse the items thoroughly using organic-free/analyte-free water.

- Allow the items to air dry completely.

- If large quantities of used decontamination solutions will be generated, each type of waste should be contained in separate containers.

- Unless otherwise required, plastic sheeting and disposable protective clothing may be treated as solid, nonhazardous waste.

- Waste liquids should be sampled, analyzed for contaminants of concern in accordance with disposal regulations, and disposed of accordingly.

6.0 Restrictions/ Limitations

Nitric acid and polar solvent rinses are necessary only when sampling for metals or organics respectively. These steps should not be used, unless required, because of the potential for acid burns and ignitability hazards.

If the field equipment is not thoroughly rinsed and allowed to completely air dry before use, volatile organic residue, which interferes with the analysis, may be detected in the samples. The occurrence of residual organic solvents is often dependent on the time of year sampling is conducted. In the summer, volatilization is rapid, and in the winter, volatilization is slow. Check with your USEPA region, state, and client for approved decontamination solvents.

7.0 References

American Society for Testing and Materials. 2002. Practice for Decontamination of Field Equipment at Nonradioactive Waste Sites, ASTM D5088-02. January 10.

Department of Energy. Hazardous Waste Remedial Actions Program. 1996. Standard Operating Procedures for Site Characterization, DOE/HWP-100/r1. September.

Exhibit H-2

Site Safety and Health Plan

DRAFT

Site Safety and Health Plan

Closure Sampling
Munitions Treatment Range
Marine Corps Air Station
Yuma, Arizona

February 2025

Prepared for:
United States Department of the Navy
Naval Facilities Engineering Systems Command Southwest
750 Pacific Highway
San Diego, CA 92132

Prepared by:
Liberty JV
1851 W. 24th Street, Suite 101
Yuma, AZ 85364-6104

Prepared under:

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ACRONYMS AND ABBREVIATIONS

ACGIH.....American Conference of Governmental Industrial Hygienists
ACOE..... Army Corps of Engineers
ADEQ .....Arizona Department of Environmental Quality
AHA.....Activity Hazard Analysis
ANSI ..... American National Standards Institute
APP .....Accident Prevention Plan

°C .....degrees Celsius
CFR.....Code of Federal Regulations
COCs.....chemicals of concern
COPC ..... constituent of potential concern
CPR..... cardiopulmonary resuscitation
CRZ..... contamination reduction zone

dB..... decibel
DEET ..... N,N'-Diethyl-3-methylbenzamide
DFOW..... Definable Feature of Work
DOT .....Department of Transportation

EOD ..... Explosives Ordnance Disposal
EZ.....exclusion zone

°F..... degrees Fahrenheit

GI ..... gastrointestinal

HAZWOPER .....Hazardous Waste Operations and Emergency Response
HEPA ..... high efficiency particulate air
H&S .....Health and Safety

IV .....intravenous

LEL ..... Lower Explosive Limit

MCAS .....Marine Corps Air Station
MTR..... Munitions Treatment Range

NAVFAC SW ..... Naval Facilities Engineering Command Southwest
NIOSH ..... National Institute for Occupational Safety and Health
NRR ..... Noise Reduction Rating

OSHA..... Occupational Safety and Health Administration

PEL .....Permissible Exposure Level
PID .....photoionization detector
PM.....Project Manager
PPE.....personal protective equipment

RAC ..... risk assessment code

SHM.....Safety and Health Manager
SSHP.....Site Safety and Health Plan
SSHO ..... Site Safety and Health Officer
SVOC..... Semi Volatile Organic Compounds

TPH.....Total Petroleum Hydrocarbons

U.S. EPA..... United States Environmental Protection Agency
UXO..... Unexploded Ordnance

VOC .....volatile organic compound

1.0 INTRODUCTION

This Site Safety and Health Plan (SSHP) has been prepared in conformance with Title 29 Code of Federal Regulations (CFR) 1910.120 for the Munitions Treatment Range (MTR) scope of work at the Marine Corps Air Station (MCAS) Yuma, Arizona. This plan addresses on-site health and safety procedures intended to guide field activities at the project work site. This SSHP establishes procedures to protect workers and the public from potential hazards posed by work at this site, identifies chemical and physical hazards that may be encountered, and defines the duties of key personnel. This plan was prepared for Naval Facilities Engineering Command Southwest (NAVFAC SW).

Elements of this plan include personal protection, personnel and equipment safety, medical surveillance, air quality monitoring, and general on-site work practices. Additionally, this plan contains provisions for emergency response and first-aid. All personnel, including government employees, subcontractors, and third parties who enter the site work zones are required to comply with this plan. Additionally, all subcontractors must submit to the contractor a properly completed Activity Hazard Analysis (AHA) for review and approval prior to the start of on-site work.

This plan is based on the best available information and is intended for exclusive use by the contractor's employees and subcontractors working on the site. This plan will be maintained on site and may be amended should site conditions, procedures, or personnel change.

2.0 PROJECT DESCRIPTION

The scope of work for this project involves soil and groundwater monitoring at the MTR. The soil monitoring will consist of surface and subsurface sampling at the MTR within existing shotholes. Groundwater monitoring will consist of collecting groundwater samples from the monitoring well downgradient of the MTR. Soil and groundwater samples will be analyzed for the constituents of concern including:

- Metals- 6010B, 7470, and 7471
- Volatile Organic Compounds (VOCs)- 8260B
- Semivolatile Organic Compounds (SVOCs)- 8270C
- Explosives- 8330
- White Phosphorus- 7580
- Nitrate/Nitrate- 353.3
- Ammonia- 350.2
- Perchlorate- 6850
- Total Petroleum Hydrocarbons (TPH)- 8015AZ Modified

Additional analytes may be added if ADEQ identifies a new regulated compound associated with explosives treated at the MTR, or if the United States Department of Defense begins to use a new compound for the manufacturing of explosives.

3.0 KEY PERSONNEL

3.1 Project Manager

The Project Manager (PM) will serve as the primary point of contact. PM responsibilities within the context of health and safety include documentation of site activities, implementation of emergency response, and verification of emergency action. In addition, the PM will ensure that personnel receive this plan, are familiar with the contents, and are aware of potential hazards associated with site or project operations.

3.2 Safety and Health Manager

The contractor Health and Safety Manager (SHM) is responsible for the preparation of the SSHP, and oversight of the project Site Safety and Health Officer (SSHO). The SHM has the authority to stop unsafe operations, remove unqualified personnel from the work area, and approve changes to the SSHP. The PM may request the SHM to act as the SSHO.

The SHM is responsible for integrating SSHP development and implementation. SHM duties include reviewing the SSHO implementation of the SSHP, advising the SSHO on health and safety issues, reviewing any site-specific plans for compliance and completeness, and establishing and monitoring health and safety procedures by conducting site safety audits.

3.3 Site Safety and Health Officer

The project SSHO duties include:

- Assuring that appropriate safety equipment is available and used according to this plan;
- Conducting safety monitoring and recording safety data;
- Contacting the base representative prior to the start of on-site work to verify methods for contacting all potential base emergency responders. Also, ensure that proper cellular telephone procedures are posted and readily available.
- Establishing the exclusion, decontamination, and support zones;
- Ensuring that everyone entering the site will sign the log-in/log-out form on a daily basis;
- Documenting accidents, incidents, and compliance issues;
- Initiating emergency response procedures when necessary, which includes establishing emergency communications with all emergency response organizations;
- Monitoring the effectiveness of personnel and equipment decontamination;
- Monitoring the effectiveness of the personal protective equipment (PPE); and
- Communicating the SSHP to site workers.

An initial kick-off meeting is planned prior to the start of field work. The health and safety section of the kick-off meeting will include a review of the SSHP by the SSHO with involved contractor personnel. The SSHP review will include the following site-specific topics: potential physical and chemical hazards, expected safe work practices, directions to nearest medical facility, and the site evacuation procedure.

Daily, the SSHO will conduct a safety meeting before the start of work. Daily meetings typically include:

- Site hazards;
- Symptoms and signs of over-exposure to site hazards;
- Physical, chemical, and toxic properties of constituents of potential concern (COPCs);
- Emergency recognition and prevention;
- Medical facilities available and their location;
- Site evacuation routes and refuge locations;
- Use and location of PPE and emergency equipment;
- Weather effects;
- Decontamination procedures;
- Duration of the work mission; and
- Site security and control measures.

Additionally, the SSHO's responsibilities include confirmation that personnel are fit for duty, coordination of emergency medical care, posting daily air monitoring results, conducting daily site safety inspections, and inspecting health and safety equipment. The SSHO documents PPE related failures to monitor the effectiveness of the PPE program.

The SSHO will investigate accidents and prepare an accident investigation report for the PM, who will forward it to appropriate regulatory agencies depending on the nature and severity of the accident or injury. Project safety inspections will be conducted daily by the SSHO and/or the PM.

The SSHO is responsible for on-site implementation and enforcement of the site safety program and procedures. The SSHO will oversee health and safety-related monitoring and will decide when action levels dictate more stringent protection.

3.4 Employee Safety Responsibility

Each employee is responsible for his or her own safety as well as the safety of others on the work site. The employee shall use equipment in a safe and responsible manner within the guidelines of the SSHP. All project personnel working at the site will be responsible for reading, understanding, and complying with the SSHP requirements. The contractor, is ultimately responsible for the implementation of an effective safety and occupational health program. The Project Manager (PM), Safety and Health Manager (SHM), Project Certified Industrial Hygienist (CIH), and Site Safety and Health Officer (SSHO) are responsible for formulating and enforcing H&S requirements, and implementing the SSHP.

Managers must conduct their businesses in compliance with governmental safety regulations and company procedures. All the contractor H&S procedures will be implemented for all the contractor employees on all projects where the contractor is the subcontractor, or a joint venture partner.

3.5 Lines of Authority

The lines of authority are as follows:

3.5.1 Project Manager

The PM for this project has the overall responsibility for the project and to assure that the requirements of the contract are attained in a manner consistent with the SSHP requirements. The PM will coordinate with the SSHO to assure that the work is completed in a manner consistent with the SSHP.

3.5.2 Health and Safety Manager and Certified Industrial Hygienist

The SHM is responsible for reviewing the SSHP and ensuring that the SSHP is complete and accurate. The Project SHM provides technical and administrative support and will be available for consultation when required. If necessary, the SHM will direct modifications to specific aspects of the SSHP to adjust for on-site changes that affect safety. The SSHO will coordinate with the SHM on necessary modifications to the SSHP. The SHM may make periodic site visits to determine compliance.

3.5.3 Site Safety and Health Officer

The SSHO is authorized to administer the SSHP. The SSHO is authorized to stop work when an imminent health or safety risk exists. The SSHO will review the essential safety requirements with all on-site personnel and will facilitate the daily safety meetings.

The SSHO has a direct line of communication and authority from the SHM to implement site-specific H&S requirements for this project and is responsible for serving as the Competent Person as defined by 29 Code of Federal Regulations (CFR) 1926.32(f). Note: A review was performed and no additional standard specific competent person requirements apply to this scope of work. Responsible for daily site safety meetings; evaluating working conditions and making recommendations to PM and SHM to modify H&S procedures; inspecting all personal protective equipment (PPE) prior to use; enforcing all site-specific H&S procedures; and observing field team members for signs of exposure, stress, or other conditions related to pre-existing physical conditions and site work activities. No work will be performed unless the SSHO or a qualified alternate SSHO is present on the job site.

3.5.4 Field Team Leader

The Project Manager will take on the role of the Field Team Leader for this project. The Field Team Leader will work in concert with the Site Safety and Health officer to implement and enforce the SSHP.

3.5.5 Field Team Members

The Field Team Members are responsible for reviewing and following the SSHP, and reporting unsafe practices to the SSHO and/or PM.

3.6 Visitors

Site visitors are required to read the SSHP and sign the Site Log/Compliance Agreement Form. Visitors will comply with relevant Occupational Safety and Health Administration (OSHA) requirements and provide their own PPE required by the SSHP. Visitors who do not adhere to the provisions of the SSHP will be required to leave the work area. Visitors who have not met OSHA training and medical surveillance requirements are not permitted to enter investigation areas where

there is elevated risk due to equipment operation or hazardous materials exposure. If a visitor not meeting the applicable OSHA requirements insists on entering the site, then all site work will cease until the unqualified visitor departs the designated work area.

4.0 HAZARD ANALYSIS AND RISK MITIGATION

The objective of the hazard analysis is to list the chemical, physical, and biological hazards that may be encountered on the site. Based on the hazard analysis review, risk mitigation will serve to promote the best possible effort to identify, control, or eliminate those site hazards that are selected for consideration.

AHAs will be used to document a risk analysis by which the steps (procedures) required to accomplish a DFOW / activity are outlined and the actual/potential hazards of each step are identified. The AHAs identify potential safety, health, and environmental hazards associated with specific tasks and provide protective measures for personnel, the community, and the environment.

The risk assessment code (RAC) is determined for each activity and defined by probability and severity of occurrence. The RAC assigned to the entire activity is the highest RAC of all the steps in the AHA.

AHA's are intended to be created by the contractor field crews/workers performing the work, with the assistance of others (SSHO, SHM, FTL, etc.) as needed. No work will begin on a DFOW until the initial AHA has been accepted by the Government Designated Authority addressing the project-specific hazards. Once accepted, the AHA will be updated in the field by the field crews so that it constantly reflects current equipment, personnel, conditions, PPE, etc.

Work will not proceed on a particular task/phase until the AHA for that task has been reviewed with work crews. Before initiating any work activity that presents hazards not identified in the initial AHAs and to address the safety or health hazards derived from changed or unanticipated conditions, the PM and SSHO will amend the AHA as necessary to facilitate field documentation and address safety issues. Additions or changes to the AHAs, which are less conservative or allow for a downgrade in PPE requirements, will require written approval from the SHM. Government Designated Authority acceptance of changes made to an AHA is not necessary as long as changes do not increase original RAC level for the activity, as long as requirements are being met and a copy is made available upon request.

The following Activity Hazard Analyses (AHAs) have been prepared for the following general/baseline phases of work:

- Mobilization/Demobilization
- DPT Operations
- Environmental Sampling (Soil and Groundwater)

4.1 Chemical Hazards

Exposure pathways for potential contaminants that may be encountered during sampling tasks are directly related to the nature of tasks, principally the direct handling of samples, type of sampling equipment used, and effectiveness of project controls. Controlled work areas and methods are

intended to mitigate potential exposures and uptake of contaminants; however, the potential still exists for exposure to contaminants that may be encountered.

Exposure pathways include:

- Inhalation - Respirable vapors or particulates present a direct route of entry for the contaminants.

- Skin absorption and contact with contaminated surfaces during sampling and contaminated material handling tasks that can be absorbed through unprotected skin or corrosion, resulting in skin irritation or potential absorption through the skin and/or skin contamination.

- Ingestion of contaminated materials adsorbed to dust particles or on surfaces resulting in potential uptake of contaminants through the gastrointestinal (GI) tract that may result in GI irritation, internal tissue irritation, and/or deposition to target organs.

- Injection while handling contaminated materials by breaking of the skin, or migration through an existing wound, resulting in localized irritation, contamination, uptake of soluble contaminants, and deposition of insoluble contaminants.

Airborne exposure is considered to be a potential exposure pathway at the site from inhalation of particulates or vapors originating from sampling activities. The potential for inhalation of COCs exists from volatilization from soil, and/or groundwater during field activities. Based on concentrations of COCs previously detected in the vicinity of the project area, and the nature of the tasks that will be completed, the potential for exposure is anticipated to be minimal. Airborne exposure to personnel outside the exclusion zone is not likely to occur based on the type of work conducted, anticipated concentration of the COCs, and dispersion through air.

Air monitoring, to determine if flammable, explosive atmospheres or personal hazards are being generated at the time of field activities, will be conducted onsite if required by the SSHO or SHM.

To mitigate potential chemical hazards at the site, recommended controls in the AHAs must be implemented (Attachment B). In addition, personal protective equipment (Section 5.5) and air

monitoring equipment must also be utilized to evaluate airborne concentrations and protect workers.

4.1.1 Exposure Pathways

Identification of COC exposure pathways is based on distinguishing those routes that chemical constituents may take to affect various environmental media. Human exposure potential can be evaluated once a constituent is in an environmental medium. The potential media of concern include soil, water and air. Applicable routes of exposure include direct skin contact, ingestion and inhalation.

Direct skin contact with COCs is unlikely during planned field activities. Contact with contaminants will be limited or prevented by wearing safety glasses and protective gloves during media handling, sampling and decontamination activities.

To reduce the possibility of ingestion of COC, no eating or drinking will be allowed within the exclusion or contaminant reduction zones. Similarly, no eating, drinking, or smoking will be allowed in the support zone unless hands are washed using soap and water.

Based on the hazard analysis, chemical hazards do exist and recommended controls must be employed to prevent these hazards from occurring [see AHAs, Attachment B]. During drilling activities, PPE (Section 5.5) will be used to protect workers.

4.2 Physical Hazards

The hazard analysis has identified physical hazards associated with the execution of this project. These include operational problems as well as potential for accidents and personal injury, and are presented in the AHA (Attachment B). The AHA describes the recommended controls that must be employed to minimize the impact of the existing hazards.

4.2.1 Heat Stress

Working in hot conditions or performing hard work in any temperature creates a great deal of heat stress on personnel who are not wearing chemical protective equipment. Additional layering of PPE creates a vapor barrier, entrapping body heat and (otherwise) evaporated sweat. All personnel should carefully monitor their own physical condition while working. In addition, supervisory personnel will direct/perform heat stress monitoring as described in Section 4.3.1.1. Work levels can increase as each individual becomes acclimatized.

Over exposure to heat from work stress, ambient temperature, and radiant heat can cause a variety of ill effects, ranging from cramps to fainting, to possible death. Employees need to assess the exposure and recognize the signs and symptoms of heat stress so they can take preventive measures. Drinking water, electrolyte fluids, protective clothing, and regular rest breaks in a cool area need to be available and used to prevent serious effects of overexposure. Heat stress can be serious. The major effects are described briefly in the following paragraphs and in detail later in this section, including symptoms and treatment.

Heat cramps are muscle spasms, caused by depletion of salt from excessive sweating, without replacement of the lost salt. Under extreme exposures, salt loss may be as much as 6 to 8 teaspoonfuls in 1 day.

Fainting, due to heat exposure, occurs when the body adapts to excess heat by dilating blood vessels in the skin and superficial muscles in order to deliver warm blood to the surface of the body where the excess energy can be delivered back to the environment. The expansion of the superficial blood vessels allows a greater than normal proportion of the circulating blood volume to be away from the central circulation (which supplies, among other organs, the brain). This lack of sufficient central pressure is worsened when a person is on his/her feet for a prolonged period of time, as gravity allows a significant blood volume to collect in the lower extremities. Combined with fatigue and mild dehydration, the diversion of blood leads to a fainting episode, as not enough blood (with oxygen and glucose) is pumped to the brain.

Heat exhaustion can result from excess loss of water and salt, and affected persons may collapse from dehydration or inadequate circulation. There is heavy sweating, little or no increase in body temperature, and a rapid pulse, up to 150 beats per minute.

Heat stroke is an extreme failure of the body thermoregulatory system, with hot, dry skin, flushed face, rapid breathing, pounding pulse, and high body temperature greater than 104°F. Continuous exposure to extreme heat for as little as 3 hours can produce heat stroke. Brain disorders may range from headache to delirium to unconsciousness. Rapid cooling is urgent to prevent death.

Other factors that may magnify harmful effects of heat exposure are chemical exposures, altitude, inadequate acclimatization, fatigue, lack of sleep, consumption of alcohol, inadequate nutrition, cardiac and respiratory conditions, and taking certain medications.

4.2.1.1 Heat Stress Monitoring

Because the incidence of heat stress depends on a variety of factors, all site workers, even those not wearing protective equipment should be monitored. Physiological monitoring of site workers required to wear semi-permeable or impermeable clothing will be conducted when ambient temperatures reach 70 degrees Fahrenheit (°F) or above. Heat stress monitoring may include the following:

Heart Rate. Count the radial pulse for 30-seconds while the site worker is at rest.

- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

Oral Temperature. Use a oral thermometer with a disposable probe cover (3 minutes under the tongue) or a similar device (aural or temporal heat sensor) will be used to measure the oral temperature of the site worker at the end of the work period (before drinking).

- If the oral temperature exceeds 99.6°F [37.6 degrees Celsius (°C)] shorten the next work cycle by one-third without changing the rest period.
- If the oral temperature exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one-third.
- Do not permit a site worker to wear a semi-permeable or impermeable garment when his/her oral temperature exceeds 100.6 °F (38.1°C).

4.2.1.2 Preventive Measures

In hot environments where heat stress may be severe, the following recommendations should be considered for the protection of personnel:

- Drinking water will be made available to all personnel. The consumption of water should be encouraged, and it is recommended that frequent small amounts be consumed such as 1 cup every 15-20 minutes. The water will be cool drinking water and not ice cold.
- Work/rest regiment should be adjusted in accordance with the temperature and to allow each worker to properly acclimate to the site conditions.
- Breaks taken in an air conditioned or shaded cool area will reduce the heart rate and allow for a greater margin of safety in preventing heat stress conditions.
- Employees should be trained in the recognition of the signs and symptoms of heat stress.

- It is imperative that treatment begin immediately if symptoms and signs of severe heat stress are present.
- Wear head covering and loose fitting, absorbent clothing, preferably cotton, to assist evaporation.
- If possible, schedule strenuous work and hot work in cooler part of the day.

4.2.1.3 Heat Cramps

Heat cramps can be caused by working in a hot environment and not replenishing fluids or electrolytes being lost while sweating.

Symptoms:

- Spasms (cramps) of the skeletal muscles.

Treatment:

- Drink water and electrolyte solutions. With proper fluid and electrolyte replacement, heat cramps may be prevented. Salt tablets are not to be used.
- General motion, stretching, and massage of the affected muscles should relieve the cramps.
- If symptoms are not relieved or if spasms are severe and multiple, transport to the nearest doctor for possible saline intravenous (IV).

4.2.1.4 Fainting

A victim who has suffered a fainting episode in the heat should be examined for any head or neck injuries, as well as other possible breaks or cuts. Other causes of fainting must be considered (low blood sugar, abnormal heart rhythm, etc.). If fainting is due to the heat, the victim will reawaken shortly, as the horizontal position returns blood to the brain and solves the major problem. In general, body temperature is not elevated.

Symptoms:

- Warning signs of a fainting spell include dizziness, lightheadedness, nausea, weakness, sweating, blurred vision, or seeing flashing lights.

Treatment:

- At the onset of symptoms, immediately assume a horizontal position or sit and lower the head between the knees.
- If fainting has occurred, the victim should be rested in a horizontal position for 15 to 30 minutes.
- Drink water and electrolyte solution (1 or 2 pints).

4.2.1.5 Heat Exhaustion

Heat exhaustion can develop after several days of exposure to high temperatures and inadequate or unbalanced replenishment of fluids. If untreated, heat exhaustion may progress to heat stroke if sweating ceases.

Symptoms:

- Skin clammy and moist, pale, muddy, or flushed.

- Oral temperature can be below the normal 98.6°F.
- The pulse may be weak with the blood pressure low, causing fainting, especially upon standing after sitting.
- Brain will be rational, but may have a headache.
- General symptoms are extreme fatigue, weakness, giddiness, and nausea. Any one symptom or all symptoms may be present.

Treatment:

- Remove and protect from sunlight and other heat sources.
- Removal all PPE from the victim and loosen clothing.
- Place the victim in a supine position with feet slightly elevated.
- Provide electrolyte solution to replenish both the salt and fluids lost from sweating.
- Provide cold water to drink and pour over face and head.
- Evacuate to cool, preferably air conditioned room.
- Transport to definitive medical care.
- Recovery typically occurs within 1 to 5 days if properly treated.

4.2.1.6 Heat Stroke (Sunstroke)

Heat stroke can occur during environmental heat exposure with lack of thermoregulation. Heat stroke may be fatal unless treated promptly and adequately (vigorously).

Symptoms:

- Skin is hot and dry, red, mottled, or cyanotic (gray to blue).
- Oral temperatures of 104°F and above.
- Heart pounding and rapid.
- The worker may become confused, delirious, unconscious, or comatose, either slowly or rapidly.

Treatment:

- Call for immediate ambulance support.
- Remove and protect from sunlight and other heat sources.
- Remove all PPE and clothing from the victim as decency permits.
- It is essential that treatment begin immediately. Rapid cooling of the body is imperative.
- Place ice packs, if available, on the forehead, behind the neck, and groin areas.
- Shade the victim from sun and any other heat source.
- Evacuate to a safe area, or if evacuation is delayed, initiate additional treatment before reaching a safe area.
- If possible, wrap the unclothed body in wet sheets and fan vigorously with cool, dry air.

- If wrapping in sheets is not feasible, fan the victim vigorously (use an electric fan if available).
- Place the victim flat on their back, or slightly elevate their head/shoulders.
- Give the victim sips of cool water, if they are conscious, coherent, and not nauseated/or vomiting.
- Sponge the victim cool water and/or to lightly spray with water (avoiding the face), while fanning the victim.
- Protect the victim from further injury if they convulse while awaiting ambulance transport by; removing obstacles that might be struck by the victim during the course of the convulsions, and placing a soft, rolled up piece of cloth or clothing between the victims teeth to prevent damage to the tongue.

4.2.2 Utility Hazards

To minimize potential hazards posed by underground and overhead utilities within the project area, the following policies and procedures will be implemented:

- All applicable utility clearance permits will be obtained and approved from base personnel and/or utility companies prior to initiating intrusive operations.
- A utility survey will be conducted to identify the location of underground and overhead utilities in the vicinity of any drilling locations.
- All available utility maps will be kept onsite at all times during drilling activities.

4.2.3 Hand Tool and Equipment Hazards

To minimize the potential of hazards associated with the use of hand tools and other equipment during field activities, the following policies and procedures will be implemented:

- All hand tools and equipment will be inspected for wear and tested for proper function prior to use.
- All maintenance records for applicable equipment will be reviewed prior to use to ensure that all scheduled maintenance has been performed.
- Good housekeeping practices will be used.
- Adequate work space will be established before operating all hand tools or equipment.
- Only trained, qualified personnel will be assigned to operate individual equipment.
- Contractor personnel will not handle any subcontractor owned tools or equipment.

4.2.4 Slip, Trip and Fall Hazards

To minimize the potential for slips, trips and falls, the following procedures will be implemented:

- Tree branches, vegetation, rocks and other ground hazards will be cleared from around each boring location.
- Good housekeeping practices will be used.

- Appropriate foot protection (i.e. steel-toed boots) will be worn at all times to help prevent slips and trips.
- Extreme caution will be used when working on uneven and/or wet surfaces.

4.2.5 Noise Hazards

Potential noise hazards exist during drilling operations and pilot study activities. Hearing protection (i.e. approved earplugs, earmuffs or both) will be used by all contractor field personnel and subcontractors whenever noise measurements in excess of 85 decibels (dB) are identified, either by documentation or monitoring. Hearing protection and noise monitoring requirements are described in Section 5.7.

4.3 Biological Hazards

The various biological hazards present at this site are described below. The recommended controls that must be implemented to minimize the impacts of these hazards are detailed in the AHA (Attachment B)

4.3.1 Insects, Snakes, and Animal Bites

Bees and spiders pose the most common biological hazard encountered during field work. Less frequent hazards are snakes and various other animals. Spiders thrive in the warm, wet environments of well casings and vault enclosures while snakes and other small animals may be found under rocks, plastic sheeting, tires, and other natural and man-made items that offer shelter.

Rattlesnakes must be avoided at all times. A sharp rattling sound may indicate a rattlesnake's presence. If a rattlesnake is encountered, workers should immediately leave the area and seek outside help to deal with the creature. If a rattlesnake bite does occur, the victim should be transported to the nearest medical facility as quickly as possible.

The protocol for mitigating biological hazards will begin with the SSHO identifying personnel with known allergic reactions to insect bites or stings, and notifying field supervisors prior to project assignment.

Though animal bites, insect stings, and ticks can cause localized swelling, itching, and minor pain that can often be handled by first aid treatment, sensitized individuals can experience more serious

effects such as anaphylactic shock. This type of shock can lead to severe reactions in the circulatory, respiratory, and central nervous system, and in some cases, death. In consideration of this potential, all cases of stings and bites will be handled as an emergency that requires medical attention. In the event of an animal bite, no attempt should be made to capture the animal.

4.3.2 Hantavirus and Arenavirus

Animal and bird droppings often contain mold, fungus, or bacteria posing a significant respiratory hazard that can cause lung diseases and allergies. Hantavirus and arenavirus are known to be transmitted by exposure to rodent droppings. Rodents shed the virus in their saliva, urine, and feces. Particles and droplets containing the virus can become airborne, spreading the virus as humans breathe the contaminated air.

Employees required to enter areas inhabited by wild animals will be instructed not to touch animal droppings, and to wear, at a minimum, gloves and protective full-body suits (i.e., Tyvek®). Good hygiene practices will help to minimize the potential for exposure to these hazards.

4.3.3 West Nile Virus

West Nile virus is primarily transmitted among wild birds by infected mosquitoes. The infected mosquitoes can also transmit the virus to humans, causing a mild flu-like illness that typically lasts for a few days. In rare cases, the virus can cause encephalitis, which is an inflammation of the brain.

The following precautionary measures against West Nile virus are included for field personnel:

- Maximize skin coverage using long sleeves;
- Apply an insect repellent containing N,N'-Diethyl-3-methylbenzamide (DEET) to thin clothing and exposed skin; and
- Avoid those times of day when mosquitoes are most active (dawn and dusk).

4.4 Task-Specific Hazard Analysis and Recommended Controls

The task-specific hazard analysis is conducted prior to the start of the project and is based on available information. The hazard analysis will be revised as needed, depending on work conditions and as additional requirements are identified. Any changes to the hazard analysis will be noted in the field copy of the SSHP. Notations will include project instructions provided to on-site workers and the date and time that changes were made. The AHA is available as Attachment B.

5.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

5.1 Medical Monitoring of Personnel

The contractor's Medical Surveillance Program is directly supervised by a licensed physician board certified in occupational medicine and incorporates medical monitoring. The medical monitoring of all the contractors work force personnel is determined based on the results of industrial hygiene surveys, prior site characterization, and is exposure driven. In the absence of industrial hygiene data, medical personnel will make a decision on placement in medical surveillance programs based on knowledge of the workplace, job requirements and review of employee's occupational history. If necessary, physicals or stressor-specific evaluations will be performed by a qualified physician board certified in occupational medicine. Subsequent exams are performed as frequently as medical authorities determine is necessary for the safety of the individuals involved. The contractor medical consultants will determine the content of the physical.

5.2 Restricted Access Work Zone

Regulated areas: For this project, the work area may include three separate zones: an exclusion (or "hot") zone, a contamination reduction (decon) zone (CRZ), and a support zone. The work areas have not been predetermined or mapped; however, they will be identified at the start of each day

and as the active work areas migrate across the project site. Additionally, the restricted access zones may be affected by a significant change from the typical westerly wind direction.

5.2.1 Exclusion Zone

The exclusion zone (EZ) includes the area in the vicinity of well installation and sampling activities. Employees will use appropriate personal protective equipment PPE when working in those areas. The exclusion zone will be defined as an area where there is a possible respiratory or contact health hazard. In most instances, this area will be defined by a 10-meter or less radius from the operating equipment. Cones, yellow caution tape, or other appropriate delineation will identify the location of exclusion zones. Personnel entering the EZ must log in and log out from the site.

5.2.2 Contamination Reduction Zone

Personnel entering or leaving the exclusion zone will pass through the contamination reduction zone for accountability and to confine contamination. Decontamination of personnel and equipment will be performed at designated locations within the contamination reduction zone. Personal protective outer garments and respiratory protection will be removed in the contamination reduction zone, secured, and properly labeled. The contamination reduction zone is defined as the limit of the exclusion zone for this project.

5.2.3 Support Zone

The support zone consists of an area outside the contamination reduction zone. The support zone will be located to minimize potential contaminant exposure. Eating and drinking will be permitted in the support area only after washing face and hands.

All site visitors entering the site EZ/CRZ are required to sign the Accident Prevention Plan (APP) Acknowledgement Sheet.

5.3 Work Limitations

Work limitations include the following:

- Work is to be conducted during daylight hours except in an emergency.
- Eye protective equipment must be worn by all persons when sight hazards exist.
- Drilling operations will be performed under the guidance of a unexploded ordnance (UXO) specialist, and a magnetometer will be used to monitor for UXO at all times.

5.4 Safety Orientation Meeting

Field personnel must attend a safety orientation meeting before the start of field work. The meeting will be scheduled and conducted by the PM, SHM, and the SSHO. The meeting will include but is not limited to the anticipated scope of work review of the following health and safety topics:

- SSHP review;
- Site hazards;
- Symptoms and signs of over-exposure to site hazards;
- Physical/chemical/toxicological properties of the COPCs;

- Emergency recognition and prevention;
- Medical facility locations;
- Evacuation routes and refuge locations;
- Use and location of PPE and emergency equipment;
- Weather effects;
- Decontamination procedures;
- Duration of the work mission; and
- Site security and control measures.

5.5 Personal Protective Equipment

Field personnel will be equipped with PPE appropriate for the hazardous material being handled and the nature of the work being completed. The levels of personal protective equipment to be used for work tasks have been selected based on known or anticipated hazards and expected concentrations of materials found on the site. Personnel conducting site activities in Level D will wear the following:

- Steel-toed boots;
- Long pants and long sleeved shirt;
- Reflective safety vest (when appropriate);
- Hearing protection; earplugs and earmuffs with a Noise Reduction Rating (NRR) of 28 decibels (dB) or greater (when appropriate);
- Chemical-resistant safety glasses (when appropriate); and
- Hard hat (when appropriate).

Level D protective equipment will be modified to include additional protective equipment where skin contact with contaminants is possible. Disposable chemical resistant nitrile gloves will be worn when there is potential for contact with the known or suspected contamination. Modified Level D will be required if there is potential for splashes from contaminated liquid.

5.6 PPE Program

Based on an evaluation of the potential site-specific hazards that may be encountered during execution of field activities, this project requires that all site workers be dressed in modified level D protection including: nitrile outer gloves (when handling sampling equipment), safety glasses, hearing protection (during drilling operations), hard hat, steel toe shoes, and long pants. However, when handling powdered grout, cement, or granular carbon materials, workers will be required to

wear air purifying respirators equipped with high efficiency particulate air (HEPA) filters. All PPE will be properly stored on site in the field support vehicles when not in use and inspected in accordance with the manufacturer's recommendations prior to the start of each application to insure that the integrity of each item is sufficient for its intended use. All PPE not in full and complete working order will be repaired to full function before use, or replaced. Expiration dates on all disposable PPE, such as nitrile gloves, will be examined prior to the start of fieldwork. Expired PPE will be disposed of immediately. Donning and doffing of PPE will be performed in accordance with the manufacture's recommendations, as applicable.

5.7 Hearing Protection

Hearing protection (i.e. approved earplugs, earmuffs, or both) will be used by all the contractor field personnel and subcontractors whenever noise measurements in excess of 84 decibels (dB) are identified, either by documentation or monitoring. Field activities are not anticipated to generate noise levels in excess of 85 dB. As a result, hearing protection will not be required for the field activities.

If noise monitoring is necessary, a sound level meter (Type 2 or higher) or noise dosimeter will be utilized. Noise levels will be measured with the instrument's microphone placed within the monitored employee's hearing zone; an approximate two-foot diameter sphere surrounding the head, upon initiation of the task to be monitored. The instrument will be set to the A-weighted scale and on slow response. When using a dosimeter, it will be set at a 3 dB exchange rate with the threshold level set at 80 dB. The criterion level (allowable dose) will be set at 85 dB. Noise monitoring exposure limits are provided in Section 6.0.

5.8 Safety Equipment and Materials

The contractor field personnel shall ensure the following safety equipment and materials are readily available at each work site:

- Emergency eyewash unit meeting the requirements of American National Standards Institute (ANSI) Standard Z358.1-2009
- First-aid kit;
- Fire extinguisher (20 pound ABC-rated type); and
- Photoionization detector (PID).

6.0 EXPOSURE MONITORING

Safe work practices during field work will be used to sufficiently to protect field personnel against exposure to airborne hazardous substances. If deemed necessary by the SHM, a PID and Lower Explosive Limit (LEL) meter may be used during sampling activities to ensure that hazardous conditions are not present. If measurements exceed background levels, workers will be verbally notified immediately, and actions will be taken by the SSHO to stop work and reevaluate activities.

7.0 HAZARD TRAINING

The OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements, as described in Title 29 CFR §1910.120, apply to those persons conducting field work. The regulation states that all personnel involved in characterization or remediation of an

uncontrolled hazardous waste site shall be required to have 40 hours of certified training and three days of supervised field experience. In compliance with Title 29 CFR §1910.120, the contractor's protocol requires "general site workers," those individuals performing field activities, to have completed the appropriate OSHA HAZWOPER training course.

Personnel who are on site to perform occasional inspection and sampling activities and are unlikely to experience exposure over the permissible exposure limit (PEL) and published exposure limits, may be considered "workers on site only occasionally for a specific limited task." These workers must have 24 hours of training and one day of actual field experience. Employees who have minimal (low risk) exposure or low probability of exposure to hazardous substances are covered by other OSHA standards, such as the Hazard Communication Standard, Title 29 CFR §1910.120.

Training related actions that will be followed during the course of this project include a set of regulatory procedures, a pre-deployment "kick-off" meeting prior to the start of work, and daily on-site safety meetings.

Regulatory procedures related to training will consist of the presence of at least one supervisor having received the OSHA 8-hr Hazardous Waste Supervisor training who will be on-site at all times[1]. All the contractor site workers will be 40-hour trained and will meet the minimum standard for experience[2]. All of the contractor's employees have been trained in first aid, cardiopulmonary resuscitation (CPR), and blood borne pathogen awareness[3]. At least two of the contractor's personnel will be properly trained and certified in adult first aid and CPR and trained in bloodborne pathogen awareness and will be on-site at all times work is being performed. All employees have been trained in proper donning and doffing procedures through the 40-hour HAZWOPER course and refresher training is current.[4]

Copies of current OSHA training and medical clearance documents for all assigned site personnel (contractor and subcontractors) will be available on-site at all times during field work. Upon request, copies of these documents will be provided via fax, hand-delivery, or other means.

The pre-deployment "kick-off" meeting will address and review, among other issues, the identification of the chemical/physical/toxicological properties of each substance[5]; the chemical, physical, and toxicological hazards as identified in the SSHP; and the limitations and use of PPE, as presented in the HAZWOPER 40-hour training course.

An on-site "tail-gate" meeting will include a walk-through of safety procedures that will be followed during the project.

Daily safety meetings will be conducted to review issues such as symptoms and signs of overexposure to chemical hazards as presented during 40-hour HAZWOPER training[6].

---

[1] Regulatory reference: Title 29 CFR §1910.120(e)(4), §1926.65(e)(4); NAVFAC IR Manual Chapters 11.4 and 11.9; and ACOE EM-385-1-1 §28A.02(b)(4)(b).
[2] Regulatory reference: Title 29 CFR §1910.120(e)(3)(i), §1926.65(e)(3)(i); NAVFAC IR Manual Chapter 11.4; and ACOE EM-385-1-1 §28A.02(b)(4)(a)(iii).
[3] Regulatory reference: Title 29 CFR §1926.50(c), §1910.1030; and ACOE EM-385-1-1 §28.A.02.b(13).
[4] Regulatory reference: Title 29 CFR §1910.120(e)(8), §1926.65(e)(8): NAVFAC IR Manual Chapters 11.4 and 11.9; and ACOE EM-385-1-1 §28A.02(b)(4)(a)(ii).
[5] Regulatory reference: Title 29 CFR §1210.120(c)(8), §1926.65(c)(8); and ACOE EM-385-1-1 §28.A.02.b(4)(c).
[6] Regulatory reference: Title 29 CFR §1910.120(c)(8), and ACOE EM-385-1-1 §28.A.02(b)(4)(a)(1).

8.0 STANDARD WORK PROCEDURES

Field activities are described in the work plan and will be discussed at the daily safety meeting.

8.1 Area Marking

Cones, or construction barricades and/or yellow caution tape will bound field activities, including but not limited to the exclusion zone.

8.2 Heavy Equipment Operation

Drilling equipment will be in operation at this site during field work.

8.3 Safe Work Practices

Safe work practices for site activities include the following:

- Site personnel will enter a designated exclusion zone only through the CRZ. Personnel leaving an exclusion zone must exit through the CRZ and undergo decontamination.
- Only vehicles and equipment necessary to complete work tasks will be permitted within the exclusion zone. All nonessential vehicles and equipment will remain within the support zone.
- Containers (such as drums) will be moved only with the proper equipment and will be secured to prevent dropping or loss of control during transport.
- Site personnel will avoid contact with potentially contaminated substances. Walking through puddles or mud and kneeling on the ground will be avoided whenever possible.
- Food and beverages, use of tobacco products, and application of cosmetics will not be permitted in the exclusion zone.
- Site personnel will be required to wash their hands and faces before eating, drinking, smoking, or applying cosmetics.
- A "buddy" system will be used. Site workers will observe each other for signs of toxic exposure and heat or cold stress. Indications of adverse effects include but are not limited to: changes in complexion and skin discoloration; changes in coordination or demeanor; excessive salivation and papillary response; and changes in speech patterns. Additionally, workers will inform each other of non-visual effects of illness, such as: headache, dizziness, nausea, blurred vision, cramps, and irritation of eyes, skin, or respiratory tract.

9.0 COMMUNICATION PROCEDURES

The SSHO is assigned the responsibility to establish communications with all potential emergency response organizations prior to starting on-site work. Additionally, prior to start of on-site work, the SSHO, while identifying and establishing emergency points of contact, will also confirm and alert the nearest emergency medical facility capable and willing to deal with potentially chemically contaminated and/or seriously injured workers

Cellular phones will be present on the site while work is in progress for emergency and logistical assistance. Wireless service is available and adequate on site.

Personnel in the exclusion zone should remain in regular contact (daily before and after work commences) with either the PM, SHM, or SSHO. A failure of communication requires an immediate re-establishment of communication or cessation of work until communications can be restored.

A single 15-second long horn blast is the emergency signal that site personnel should leave the exclusion zone.

The following standard hand signals will be used in case of radio communication failure:

- Hand gripping throat: Out of air, can't breathe
- Grip partner's wrist: Leave area immediately
- Hands on top of head: Need assistance
- Thumbs up: Ok, I understand, am all right
- Thumbs down: No, negative

10.0 DECONTAMINATION PROCEDURES

The equipment decontamination procedures described in the following sections are based on guidelines appropriate for low-level contamination. When appropriate, Liquinox or Alconox cleaning solutions and deionized water rinses will be used to decontaminate equipment. Wastewater generated by equipment decontamination activities will be stored in 55-gallon containers or Department of Transportation (DOT) approved containers. The PM will label the wastewater and will arrange for this investigation-derived waste to be transported to an authorized disposal facility.

10.1 Reusable Equipment

Reusable equipment will be decontaminated before and after each use. Deionized water will be used for the following sampling equipment decontamination procedures:

- Scrub the equipment with a brush in a bucket containing Liquinox or Alconox solution and potable, distilled water.
- Triple-rinse the equipment with distilled water, and allow it to air dry.
- Reassemble the equipment and place it in a clean area on plastic or aluminum foil. If aluminum foil is used, wrap the equipment with the dull side of the aluminum foil toward the equipment.

10.2 Personnel

Remove and bag disposable chemical-resistant gloves and clothing (i.e., Tyvek) in a plastic trash bag. If cotton coveralls are used, bag and wash prior to re-wearing. Field workers will be instructed to wash hands and face using soap and water and to take a shower and wash hair as soon as possible after leaving the site.

10.3 Investigation-Derived Waste

No investigation derived wastes are anticipated to be generated during field work.

11.0 CONFINED SPACE ENTRY

The tasks for this project do not involve confined-space entry.

12.0 UPDATES OF HEALTH AND SAFETY PLAN

Updating of this Health and Safety Plan shall be done as frequently as necessary to ensure safe work conditions. Suggestions should be brought to the attention of the PM, SHM, or SSHO. If unforeseen situations arise, this plan will be updated accordingly.

13.0 EMERGENCY ACTION PLAN

This Emergency Action Plan (EAP) has been prepared to comply with 29CFR1910.38. The purpose of the EAP is to facilitate and organize actions during emergencies. The elements of the EAP are described in detail below.

13.1 Means of Reporting Fires and Other Emergencies

In the event of a fire or explosion at the site, the Fire Department will be contacted as soon as possible, and evacuation of the site will begin immediately. Emergency phone numbers are included as Attachment C.

13.2 Evacuation Procedures and Emergency Escape Route Assignment

Workers will evacuate the exclusion zone by the most expedient route available, preferably through the contamination reduction zone. In the event site evacuation is necessary, the evacuation meeting location will be described at the daily tailgate meeting. The emergency meeting location(s) are illustrated on the Site Map (Attachment A). In all situations when an emergency results in the evacuation of the exclusion zone, personnel must not re-enter until:

- The conditions causing the emergency have been corrected.
- The existing hazards have been reassessed.
- The SSHP has been reviewed.
- Site personnel have been briefed on any changes to this SSHP.
- The route to the medical facility is included as Attachment D.

13.3 Procedures to be Followed by Employees Who Remain to Operate Critical Plant Operations Before They Evacuate

Employees are not required to remain on site during evacuation procedures.

13.4 Procedures to Account for all Employees after an Emergency Evacuation has been Completed

In the event of an evacuation, the SSHO will be responsible for ensuring that all personnel evacuated the site. The SSHO will account for all personnel at one of the meeting locations illustrated in Attachment A. The meeting location will be discussed each day in the tailgate meeting.

13.5 Rescue and Medical Duties for Those Employees Who are to Perform Them

Rescue and medical duties will be performed by the fire department. Emergency phone numbers are provided in Attachment C.

13.6 Names or Job Titles of Persons Who can be Contacted for Further Information or Explanation of Duties under the Plan

Additional information or clarification of some aspects of the plan may be obtained by contacting the SHM assigned by the contractor.

14.0 REFERENCES

Department of the Navy, 2006. Environmental Restoration Program Manual, August.

National Institute for Occupational Safety and Health (NIOSH), OSHA, United States Coast Guard, United States Environmental Protection Agency (U.S. EPA), *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, Department of Health and Human Services Publication No. 85-115, October 1985.

Navy Environmental Health Center, 2007. *Medical Surveillance Procedures Manual and Medical Matrix (Edition 9).* August.

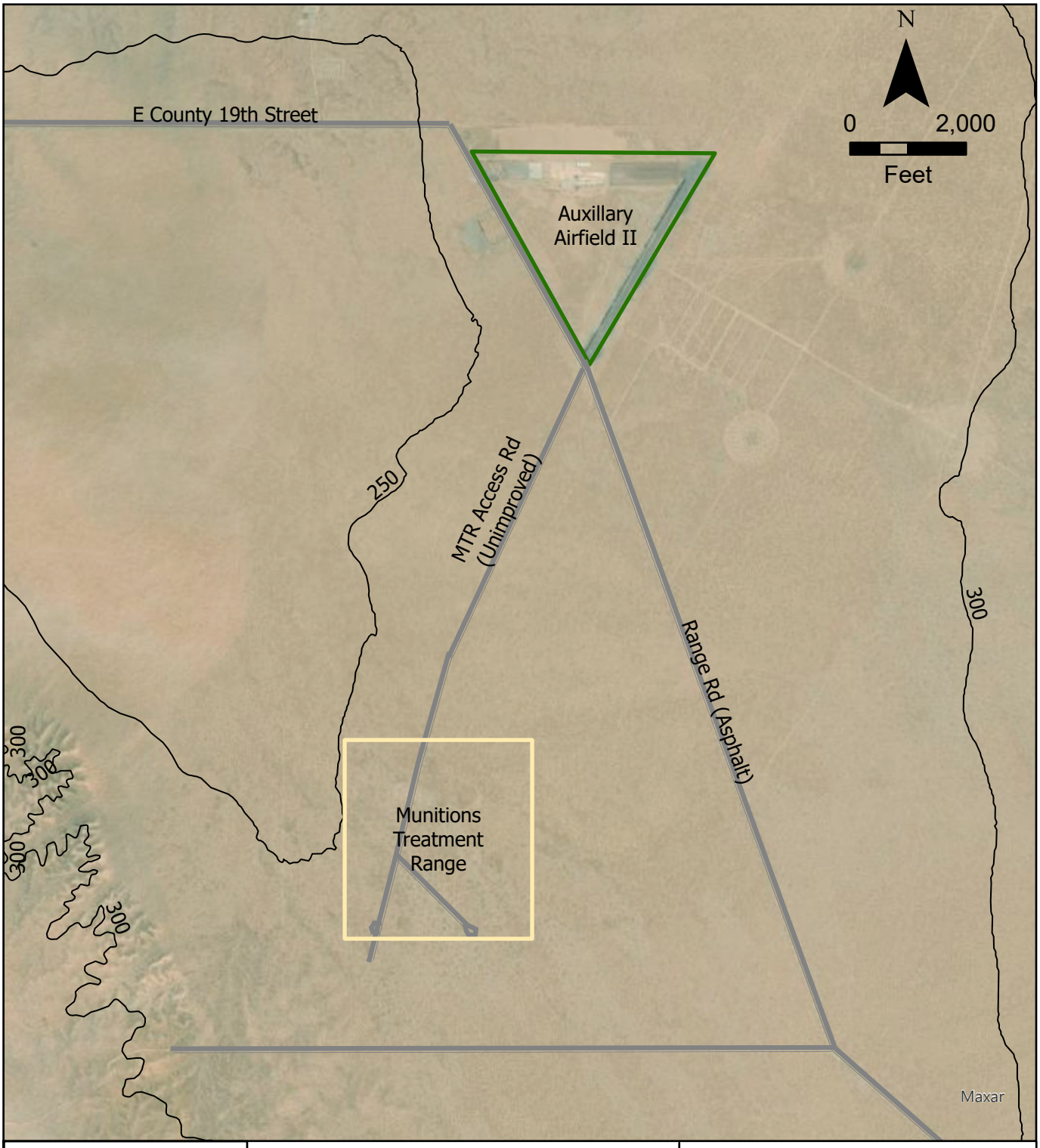
United States Department of Army, 2011. *U.S. Army Corps of Engineers (ACOE) Safety and Health Manual,* EM 385-1-1. July 5.

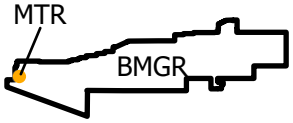
United States Department of Labor Occupational Safety and Health Administration (OSHA), *Title 29 CFR §1910 (General OSHA Standards) and §1926 (Safety and Health Standards for Construction).*

United States Environmental Protection Agency (U.S. EPA), 1992. *Standard Operating Safety Guides*, June.

Site Safety and Health Plan Attachment A

MTR Site Location Map





Munitions Treatment Range

Ground Elevation (feet)

Roads

Auxillary Airfield II

Attachment A
MTR Site Location Map
Barry M. Goldwater Range

Site Safety and Health Plan Attachment B

Activity Hazard Analysis

Activity Hazard Analysis (AHA) #1

Activity/Work Task: General Job Safety	Overall Risk Assessment Code (RAC) (Use highest code)	H
Project Location: MCAS Yuma	**Risk Assessment Code (RAC) Matrix**	
Contract Number: N44255-20-D-5006		
Date Prepared: 2-Jan-25		
Prepared by (Name/Title): Arielle Brooksher		
Reviewed by (Name/Title): Mike Daniel		

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Working at MTR	Explosion From Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Working Outdoors	Solar Radiation Hazard	Wear protective clothing to prevent exposure to the sun.	L
		Use sunscreen and reapply as needed.	
		Use shade to minimize UV exposure and heat stress.	
	Dehydration	Drink at least 1/2 liter of water an hour.	
		Work/rest regimen will be adjusted in accordance with temperature.	
		If possible, strenuous work will be scheduled during the cooler times of the day.	
	Bee, Insect, Vermin, Snakes, and Stings	Advise SSHO if you are allergic to bees or other insects prior to fieldwork.	L
		Do not agitate or disturb insects or other animals.	
		Avoid wearing perfumes, hair spray, or scented lotions.	
		Be aware of potential species locations (culverts, drainage pipes, junk piles, and dense shrubbery).	
		If stung, remove stinger as quickly as possible by raking your fingernail	
		Thoroughly inspect the site area prior to work.	
		Walk or hike in areas where the ground is clear, so you can see where	

		Wear protective clothing such as long heavy pants and high boots.	
		Wear gloves when using your hands to move rocks or brush.	L
		Ledges, cracks or holes are common areas where snakes and insects can be found resting.	
		Report any bites/stings to the SSHO and seek medical attention	
	Slip, Trip, and Fall Hazards	Wear proper footwear at all times.	M
		Use caution when walking on slopes or were moisture is present.	
		Follow good housekeeping procedures in work space.	
		Maintain proper lighting at the site.	
		Remove or clearly mark objects that pose tripping hazards.	
		Walk, do not run while on site.	
		Prevent water accumulation where practicable.	
		Carry objects in a manner that allows you to see in the area you are moving in.	

Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**
Level D PPE	Tailgate Meeting	SSHO Inspections

Activity Hazard Analysis (AHA) #2

Activity/Work Task: Mobilization & Demobilization	Overall Risk Assessment Code (RAC) (Use highest code)		H
Project Location: MCAS Yuma	**Risk Assessment Code (RAC) Matrix**		
Contract Number: N44255-20-D-5006	**Severity**	**Probability**	
Date Prepared: 2-Jan-25		Frequent / Likely / Occasional / Seldom / Unlikely	
Prepared by (Name/Title): Arielle Brooksher	Catastrophic	E / E / H / H / M	
	Critical	E / H / H / M / L	
Reviewed by (Name/Title): Mike Daniel	Marginal	H / M / M / L / L	
	Negligible	M / L / L / L / L	

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Entering MTR/Working at MTR	Explosion From Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Driving to Site	Traffic Accident	Ensure driver has a valid state issued drivers license.	L
		Obey all traffic laws.	
		Secure all items to prevent movement\missile hazards while driving.	
		Do not use cell phones while driving unless equipped as hands-free.	
		Be alert and exercise defensive driving techniques.	
		Adjust driving speed to compensate for poor road and weather conditions.	
	Stress and Fatigue	Drivers should be capable and well rested before driving long distances. Change drivers frequently to prevent fatigue or drowsiness. Take frequent breaks as necessary.	L
		A 12 hour workday is the maximum allowed for any activity of which 10 hours may be spent driving.	
Set up necessary work zones	Back Injury/Strain	Observe proper lifting techniques to lessen the chance of injury.	L
		Ask for help if load is heavy.	
	Traffic Hazard	Wear high-visibility safety vest in traffic areas. Follow all flight line rules and policies. Watch for oncoming traffic. Use a spotter if traffic is heavy.	M
	Chemical Exposure	Plan and demarcate work zones appropriate for the type of contaminants that may be encountered onsite.	L
		If appropriate, use caution tape, cones, or other barriers to differentiate work zones.	
Packing Equipment	Back Injury/Strain	Observe proper lifting techniques lessen the chance of injury. Ask for help if load is heavy.	L

Driving from Site	Traffic Accident	Ensure driver has a valid state issued drivers license.	L
		Secure all items to prevent movement\missile hazards while driving.	
		Obey all traffic laws.	
		Do not use cell phones while driving unless equipped as hands-free.	
		Be alert and exercise defensive driving techniques.	
		Adjust driving speed to compensate for poor road and weather conditions.	
		A 12 hour workday is the maximum allowed for any activity of which 10 hours may be spent driving. Drivers should be capable and well rested before driving long distances. Change drivers frequently to prevent fatigue or drowsiness. Take frequent breaks as necessary.	

Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**
Level D PPE Motorized Vehicles	Tailgate Meeting Valid Driver's License	SSHO Inspections Conduct safety check prior to operation

Activity Hazard Analysis (AHA) #3

Activity/Work Task: DPT Sampling	Overall Risk Assessment Code (RAC) (Use highest code)	H
Project Location: MCAS Yuma		
Contract Number: N44255-20-D-5006		
Date Prepared: 2-Jan-25		
Prepared by (Name/Title): Arielle Brooksher		
Reviewed by (Name/Title): Mike Daniel		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
Working at MTR	Explosion from Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Soil Handling	Struck By	All equipment and tools will be properly secured during transport. All vehicles and equipment will comply with airfield requirements.	M
	Slips, Trips, Falls	Clear obstructions from the excavation area. Practice good housekeeping keeping area clear of obstructions, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. Use caution when walking around the excavation area.	L
	Backing	Use a ground guide along with a functioning back-up alarm during equipment backing.	L
Drilling	Struck By	Utilize appropriate PPE in the exclusion zone. Ensure that ground workers have eye contact with the heavy equipment operator. Ensure that all personnel utilize appropriate hand signals to communicate with the heavy equipment operator.	M
	Chemical Exposure	All personnel will wear personnel protective equipment specified in the SSHP. Personnel and equipment decontamination procedures will be followed.	L
	Electrocution	No overhead or underground electric lines are located in the vicinity of the site.	M
	Pinch and Caught By	All motors must be shut off and electrical, mechanical and hydraulic components locked out of service when making repairs. All personnel shall be trained on kill switch locations.	L
	Fire	All motors must be shut off during refueling.	M
		Fuel containers will not be stored within 10 feet of the equipment. Fuel will be stored in UL approved safety containers with contents clearly labeled.	
		Smoking in the vicinity of the equipment is not permitted.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Level D PPE	Site specific training	SSHO Inspections
Motorized Vehicles	Valid state issue driver's license	Conduct safety check prior to operation.
Hand Tools	Job specific training	Applicable PPE will be inspected in accordance with manufacturer's recommendations.
	Tailgate meeting	Thoroughly inspect tools for corrosion or damage prior to use.

Activity Hazard Analysis (AHA) #4

Activity/Work Task: Soil & Groundwater Sampling	Overall Risk Assessment Code (RAC) (Use highest code)	H
Project Location: MCAS Yuma	**Risk Assessment Code (RAC) Matrix**	
Contract Number: N44255-20-D-5006		
Date Prepared: 2-Jan-25		
Prepared by (Name/Title): Arielle Brooksher		
Reviewed by (Name/Title): Mike Daniel		

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Working at MTR	Explosion from Unexploded Ordnance	EOD will observe work at all times and a UXO specialist will use a magnetometer to monitor for UXO at all times.	H
Soil and Groundwater Handling	Chemical Exposure- Dermal Contact	All personnel will wear appropriate PPE including chemical resistant gloves (as approriate) and safety goggles or glasses. All personnel will be required to follow appropriate decontamination procedures.	L
	Chemical Exposure- Inhalation	PPE may be upgraded to include respiratory protection at the discretion of the SSHO and SHM.	L
	Slips, Trips, Falls	Clear obstructions from the work area. Practice good housekeeping keeping area clear of obstructions, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. Use caution when walking around the excavation area.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Level D PPE	Site specific training	SSHO Inspections

Site Safety and Health Plan Attachment C

Site Emergency Phone Numbers

SITE EMERGENCY PHONE NUMBERS

Hazards of Concern: VOCs, SVOCs, Metals, Explosives, White Phosphorus, Nitrates/Nitrites, Ammonia, Perchlorate, Hydrocarbons, physical burns, explosions

Minimum Level of Protection: Level D

Emergency resources are listed below.

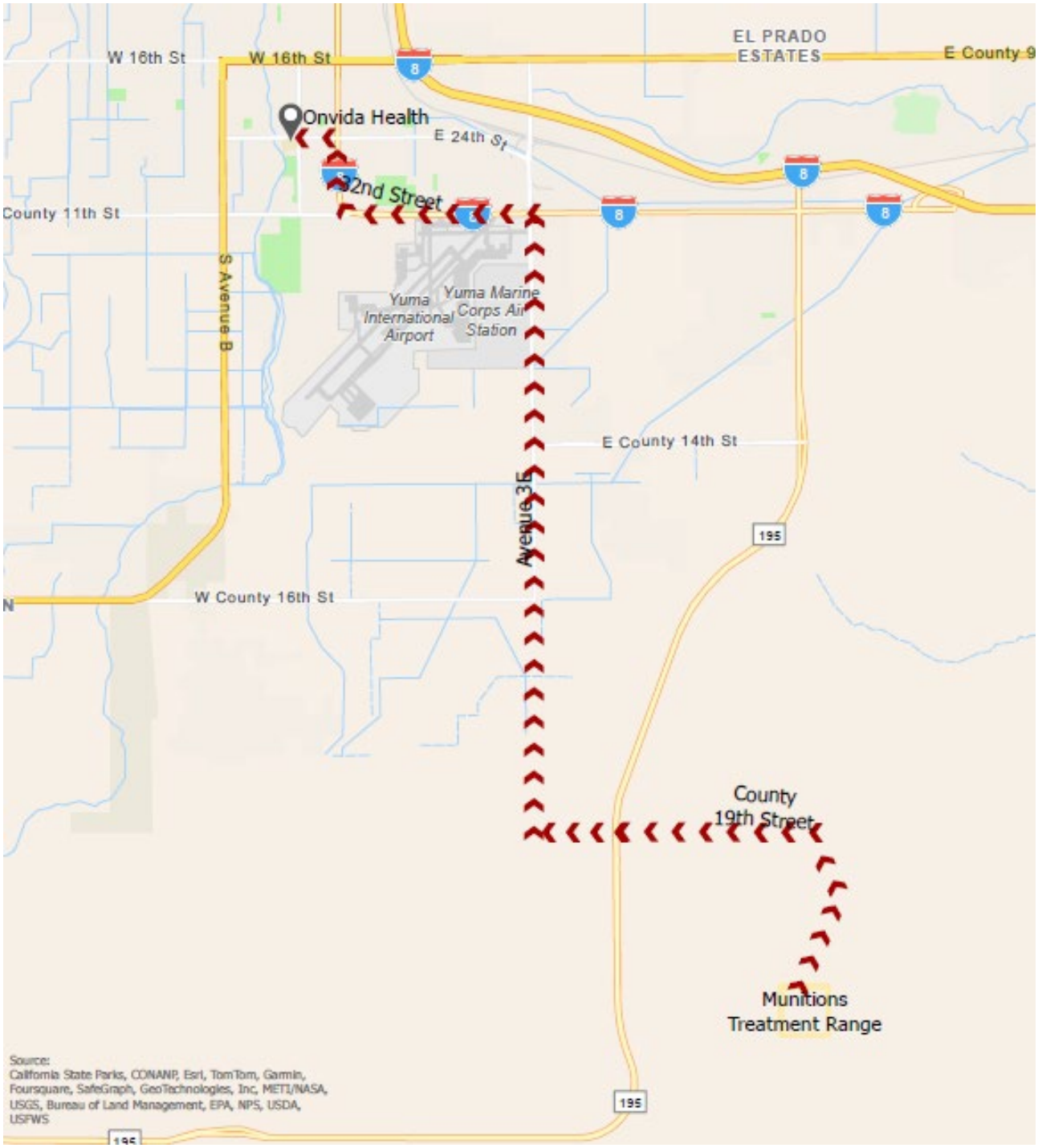
THE MOST RAPID RESPONSE TO AN EMERGENCY SITUATION WILL BE ACHIEVED BY CALLING 928-269-2333. This number is the direct dial contact with MCAS Emergency Responders/Fire Department. A call to 911 will ultimately be routed to the MCAS Fire Department.

Emergency Contact Numbers

Emergency Contact	**Phone Number**
Onvida Health	928-336-2000
Emergency Response (Fire Department)	**928-269-2333** or 911
MCAS Yuma Environmental Director	(928) 269-2282
MCAS Yuma Range Compliance & Inspection Division Director	(928) 269-2936

Site Safety and Health Plan Attachment D

Medical Facility Address and Route Map



Onvida Health
2400 S Avenue A
928.344.2000

Onvida Health is the closest medical facility. Onvida Health is located at 2400 S. Avenue A.

From the Munition Treatment Range, head north east on the MTR access road. Turn Northwest onto bombing range access road via County 19th Street. Continue West on County 19th Street. Turn North via Avenue 3E and continue to 32nd Street. Travel West on 32nd Street through the "big curve" (32nd Street to 4th Avenue transition) and continue to travel North on 4th Avenue to 24th Street. Travel West to Avenue A. Onvida Health is on the Southwest corner of Avenue A and 24th Street.

Site Safety and Health Plan Attachment E

Safety Field Forms

SITE ENTRY LOG

CTO No. _____ Site No. _____ Site Name _____Date _____

Task or WBS No. _____ Site Location Description _____

HWP No.	Name	Signature	Employer	Employee No.	Time In	Time Out	Exclusion Zone Entry	First Aid Qualified

Reviewed:

_____ _____ _____

Site Safety and Health Officer (Print Name) (Signature) (Date)

TAILGATE SAFETY MEETING DOCUMENTATION

PROJECT TAILGATE SAFETY MEETING SHEET

DATE: _____ **WORK LOCATION:** _____ **WEATHER:** _____

PM (Name): _____ **SHSO (Name):** _____

TASKS TO BE PERFORMED: _____

_____

_____

_____

_____

_____

TASK HAZARDS: _____	**HAZARD MITIGATION:** _____
_____	_____
_____	_____
_____	_____

OTHER POTENTIAL HAZARDS OR CONCERNS: _____

_____

PRE-JOB BRIEFING DATE (primary field crew): _____

REVIEWED PROJECT DOCUMENTS:

- ❑ SCOPE OF WORK
- ❑ PROJECT SPECIFICATIONS
- ❑ SAMPLE AND ANALYSIS PLAN (SAP)
- ❑ QUALITY ASSURANCE PROJECT PLAN (QAPP)
- ❑ HEALTH AND SAFETY PLAN (HASP)
- ❑ OTHER _____

LESSONS LEARNED FROM PREVIOUS ACTIVITIES: _____

_____

_____

TAILGATE SAFETY MEETING ATTENDEES

NAME (PRINTED)	SIGNATURE	COMPANY	DATE

DAILY FIELD REPORT

DATE: _____ PAGE ____ OF _____

JOB NO. _____ FACILITY:_____

SITE: _____

HWP NOS. _____ LOGBOOK NO. _____

RECORDED BY:_____

ADDITIONAL FIELD STAFF/ROLES:

SUBCONTRACTOR: | WEATHER CONDITIONS:

EQUIPMENT	HOURS WORKED	WORK PERFORMED

FIELD ACTIVITIES/COMMENTS:

DATA TRANSMITTED WITH THIS REPORT:

1) COC #'s:

2) Sample Nos. :

3) Health & Safety Issues:

SAFETY & OCCUPATIONAL HEALTH DEFICIENCY TRACKING LOG

Description of the Deficiency	Date Identified	Person responsible for correcting the deficiency	Projected Resolution Date	Date Corrected

(For safety staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS** **ACCIDENT INVESTIGATION REPORT** For use of this form, see Help Menu and USACE Supplement to AR 385-40 The proponent agency is CESO	REQUIREMENT CONTROL SYMBOL: CEEC-S-8 *(R2)*

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ PUBLIC ☐ FATAL ☐ OTHER				☐	

2. PERSONAL DATA

a. NAME *(Last, First MI.)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)* _____

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(YYYYMMDD)*	b. TIME OF ACCIDENT *(Military Time)* hrs.	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME (2) SUBCONTRACTOR

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
_____ ☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)* _____	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)* _____	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)*

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY (CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT (CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY (CODE) #	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	g. TYPE AND SOURCE OF INJURY/ILLNESS
PRIMARY _____ (CODE) #	TYPE _____ (CODE) #
SECONDARY _____ (CODE) #	SOURCE _____ (CODE) #
f. NATURE OF ILLNESS / INJURY (CODE) #	

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT (CODE) #	b. PERSONAL FLOTATION DEVICE USED?
	☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT					
a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT APPLICABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE ☐☐ TRUCK ☐☐ OTHER *(Specify)* _____	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)* _____	(1) FRONT SEAT	☐	☐	☐
		(2) REAR SEAT	☐	☐	☐

8. PROPERTY MATERIAL INVOLVED		
a. NAME OF ITEM	b. OWNERSHIP	c. AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE)	a. ACTIVITY AT TIME OF ACCIDENT	(CODE)
_____	# ☐	_____	# ☐

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary, see attached page 4.)*

11. CAUSAL FACTOR*(s) (Read instructions before completing)*

a. *(Explain YES answers in item 13)*	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident?	☐	☐
b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT? *(If yes, attach a copy.)*	☐	☐

12. TRAINING		
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING	c. DATE OF MOST RECENT FORMAL TRAINING *(YYYYMMDD)*
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE*(s) (Attach additional sheets as needed, See page 4)*

b. INDIRECT CAUSE*(s) (Attach additional sheets as needed, See page 5)*

14.	ACTION*(s)* TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE*(s)*	
DESCRIBE FULLY *(Attach additional sheets as necessary, See page 5)*		
15.	DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.	
a. BEGINNING *(YYYYMMDD)*	b. ANTICIPATED COMPLETION *(YYYYMMDD)*	
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CORPS SIGNATURE, SUPERVISOR COMPLETING REPORT
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CONTRACTOR SIGNATURE, SUPERVISOR COMPLETING REPORT
f. ORGANIZATION IDENTIFIER *(Division, Branch, Section, etc.,)*		g. OFFICE SYMBOL
16.	MANAGEMENT REVIEW *(1st)*	
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
17.	MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.,)*	
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
18.	SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW	
a. ☐ CONCUR b. ☐ NONCONCUR c. ADDITIONAL ACTIONS/COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
19.	COMMAND APPROVAL	
COMMENTS		
DATE *(YYYYMMDD)*	COMMANDER SIGNATURE	

10. ACCIDENT DESCRIPTION *(Continuation)*

13a. DIRECT CAUSE*(s) (Continuation)*

13b. INDIRECT CAUSE*(s) (Continuation)*

14. ACTION*(s)* TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE*(s) (Continuation)*

GENERAL. Complete a separate report for each person who was injured, caused, or contributed to the accident *(excluding uninjured personnel and witnesses)*. Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs *(OWCP)* shall be at the discretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1 - ACCIDENT CLASSIFICATION

(Mark All Boxes That Are Applicable)

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 *(injury)*, CA-2 *(illness)* or CA-6 *(fatality)* to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to government property *(including motor vehicles)*.

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any contractor lost-time injury/illness or fatality.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property *(including motor vehicles).*

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in public fatality or permanent total disability. *(The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander)*.

(2) VOID SPACE - Make no entry.

(3) VEHICLE INVOLVED - Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" is marked.

(4) VOID SPACE - Make no entry.

INSTRUCTIONS FOR SECTION 2 - PERSONAL DATA

a. NAME - *(MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS)*. Enter last name, first name, middle initial of person involved.

b. AGE - Enter age.

c. SEX - Mark appropriate box.

d. SOCIAL SECURITY NUMBER - *(FOR GOVERNMENT PERSONNEL ONLY*) Enter the social security number *(or other personal identification number if no social security number issued).*

e. GRADE - *(FOR GOVERNMENT PERSONNEL ONLY)* Enter pay grade. Example: 0-6; E-7; WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE - For government civilian employees enter the pay plan, full series number, and job title, e.g., GS-O810/Civil Engineer. For military personnel enter the primary military occupational specialty *(PMOS)*, e.g., 15A30 or 11G50. For contractor employees enter the job title assigned to the injured person, e.g., carpenter, laborer, surveyor, etc.

g. DUTY STATUS - Mark the appropriate box.

(1) ON DUTY - Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.

(2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.

(3) OFF DUTY - Person was not on official business at time of accident.

h. EMPLOYMENT STATUS - *(FOR GOVERNMENT PERSONNEL ONLY)* Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3 - GENERAL INFORMATION

a. DATE OF ACCIDENT - Enter the month, day, and year of accident.

b. TIME OF ACCIDENT - Enter the local time of accident in military time. Example: 1430 hrs *(not 2:30 p.m.)*.

c. EXACT LOCATION OF ACCIDENT - Enter facts needed to locate the accident scene, *(installation/project name, building number, street, direction and distance from closest landmark, etc.)*.

d. CONTRACTOR NAME

(1) PRIME - Enter the exact name *(title of firm)* of the prime contractor.

(2) SUBCONTRACTOR - Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER - Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.

f. TYPE OF CONTRACT - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY *(HTW)* - Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program *(IRP)* HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site *(FUDS)* activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 - CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY - Select the most appropriate construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION
2. SITE PREPARATION
3. EXCAVATION/TRENCHING
4. GRADING (EARTHWORK)
5. PIPING/UTILITIES
6. FOUNDATION
7. FORMING
8. CONCRETE PLACEMENT
9. STEEL ERECTION
10. ROOFING
11. FRAMING
12. MASONRY
13. CARPENTRY
14. ELECTRICAL
15. SCAFFOLDING/ACCESS
16. MECHANICAL
17. PAINTING
18. EOUIPMENT/MAINTENANCE
19. TUNNELING
20. WAREHOUSING/STORAGE
21. PAVING
22. FENCING
23. SIGNING
24. LANDSCAPING/IRRIGATION
25. INSULATION
26. DEMOLITION

b. TYPE OF CONSTRUCTION EQUIPMENT - Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER
2. DRAGLINE
3. CRANE *(ON VESSEL/BARGE)*
4. CRANE *(TRACKED)*
5. CRANE *(RUBBER TIRE)*
6. CRANE *(VEHICLE MOUNTED)*
7. CRANE *(TOWER)*
8. SHOVEL
9. SCRAPER
10. PUMP TRUCK *(CONCRETE)*
11. TRUCK *(CONCRETE/TRANSIT MIXER)*
12. DUMP TRUCK *(HIGHWAY)*
13. DUMP TRUCK *(OFF HIGHWAY)*
14. TRUCK *(OTHER)*
15. FORKLIFT
16. BACKHOE
17. FRONT-END LOADER
18. PILE DRIVER
19. TRACTOR *(UTILITY)*
20. MANLIFT
21. DOZER
22. DRILL RIG
23. COMPACTOR/VIBRATORY ROLLER
24. OTHER

INSTRUCTIONS FOR SECTION 5 - INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY/ILLNESS - Reference paragraph 2-10 of USACE Supplement 1 to AR 385-40 and enter code and description from list below.

NOI	NO INJURY
FAT	FATALITY
PTL	PERMANENT TOTAL DISABILITY
PPR	PERMANENT PARTIAL DISABILITY
LWD	LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK
NLW	RECORDABLE CASE WITHOUT LOST WORKDAYS
RFA	RECORDABLE FIRST AID CASE
NRI	NON-RECORDABLE INJURY

b. ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED - Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER
HEAD, EXTERNAL	H1	EYE EXTERNAL
	H2	BOTH EYES EXTERNAL
	H3	EAR EXTERNAL
	H4	BOTH EARS EXTERNAL
	HC	CHIN
	HF	FACE
	HK	NECK/THROAT
	HM	MOUTH/LIPS
	HN	NOSE
	HS	SCALP
KNEE	KB	BOTH KNEES
	KS	KNEE
LEG, HIP, ANKLE, BUTTOCKS	LB	BOTH LEGS/HIPS/ ANKLES/
BUTTOCK	LS	SINGLE LEG/HIP/ ANKLE/BUTTOCK
HAND	MB	BOTH HANDS
	MS	SINGLE HAND
FOOT	PB	BOTH FEET
	PS	SINGLE FOOT
TRUNK, BONES	R1	SINGLE COLLAR BONE
	R2	BOTH COLLAR BONES
	R3	SHOULDER BLADE
	R4	BOTH SHOULDER BLADES
	RB	RIB
	RS	STERNUM *(BREAST BONE)*
	RV	VERTEBRAE *(SPINE; DISC)*
	RZ	TRUNK BONES OTHER
SHOULDER	SB	BOTH SHOULDERS
	SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS
	TS	SINGLE THUMB
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE
	V2	LUNGS, BOTH
	V3	KIDNEY, SINGLE
	V4	KIDNEYS, BOTH
	VH	HEART
	VL	LIVER
	VR	REPRODUCTIVE ORGANS
	VS	STOMACH
	VV	INTESTINES
	VZ	TRUNK, INTERNAL; OTHER

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury/illness from the list below. This nature of injury/illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury/illness name on the line and place the corresponding CODE letters in the box provided.
* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/INFECTIVE/ PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER, STRESS; NERVOUS CONDITION
	T8	TRAUMATIC INJURY - OTHER *(EXCEPT DISEASE, ILLNESS)*

** A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME			
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY					
RESPIRATORY DISEASE	RA	ASBESTOSIS		DD	ENDEMIC DISEASE *(OTHER THAN CODE TYPES R&S)*
	RB	BRONCHITIS			
	RE	EMPHYSEMA		DE	EFFECT OF ENVIRONMENTAL
	RP	PNEUMOCONIOSIS	CONDITION		
	RS	SILICOSIS		DH	HEARING LOSS
	R9	RESPIRATORY DISEASE, OTHER		DK	HEART CONDITION
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES				DM	MENTAL DISORDER, EMOTIONAL STRESS, NERVOUS CONDITION
	VB	BRUCELLOSIS		DR	RADIATION
	VC	COCCIDIOMYCOSIS		DS	STRAIN, MULTIPLE
	VF	FOOD POISONING		DU	ULCER
	VH	HEPATITIS		DV	OTHER VASCULAR CONDITIONS
	VM	MALARIA		D9	DISABILITY, OTHER
	VS	STAPHYLOCOCCUS			
	VT	TUBERCULOSIS	SKIN DISEASE OR		
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC - OTHER	CONDITION	SB	BIOLOGICAL
DISABILITY, OCCUPATIONAL	DA	ARTHRITIS, BURSITIS		SC	CHEMICAL
	DB	BACK STRAIN, BACK SPRAIN		S9	DERMATITIS, UNCLASSIFIED
	DC	CEREBRAL VASCULAR CONDITION; STROKE			

g. TYPE AND SOURCE OF INJURY/ILLNESS *(CAUSE)* - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident *(see example 1, below)*. Examples:

(1) An employee tripped on carpet and struck his head on a desk. TYPE: 210 *(fell on same level)* SOURCE: 0110 *(walking/working surface*).

NOTE: This example would NOT be coded 120 *(struck against)* and 0140 *(furniture)*.

(2) A Park Ranger contracted dermatitis from contact with poison ivy/oak.

TYPE: 510 *(contact)* SOURCE: 0920 *(plant)*

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.

TYPE: 410 *(punctured by)* SOURCE: 0830 *(metal)*

(4) An employee was driving a government vehicle when it was struck by another vehicle.

TYPE: 800 *(traveling in)* SOURCE: 0421 *(government-owned vehicle, as driver)*

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME		
			EXERTED
		0610	LIFTED, STRAINED BY *(SINGLE ACTION)*
	STRUCK	0620	STRESSED BY *(REPEATED ACTION)*
0110	STRUCK BY		EXPOSED
0111	STRUCK BY FALLING OBJECT	0710	INHALED
0120	STRUCK AGAINST	0720	INGESTED
	FELL, SLIPPED, TRIPPED	0730	ABSORBED
0210	FELL ON SAME LEVEL	0740	EXPOSED TO
0220	FELL ON DIFFERENT LEVEL	0800	TRAVELING IN
0230	SLIPPED, TRIPPED *(NO FALL)*		
	CAUGHT	**CODE**	**SOURCE OF INJURY NAME**
0310	CAUGHT ON		
0320	CAUGHT IN	0100	BUILDING OR WORKING AREA
0330	CAUGHT BETWEEN	0110	WALKING/WORKING SURFACE *(FLOOR, STREET, SIDEWALKS, ETC.)*
	PUNCTURED, LACERATED		
0410	PUNCTURED BY	0120	STAIRS, STEPS
0420	CUT BY	0130	LADDER
0430	STUNG BY	0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0440	BITTEN BY	0150	BOILER, PRESSURE VESSEL
	CONTACTED	0160	EQUIPMENT LAYOUT *(ERGONOMIC)*
0510	CONTACTED WITH *(INJURED PERSON MOVING)*	0170	WINDOWS, DOORS
0520	CONTACTED BY *(OBJECT WAS MOVING)*	0180	ELECTRICITY

0200	ENVIRONMENTAL CONDITION	0631	CARBON MONOXIDE
0210	TEMPERATURE EXTREME *(INDOOR)*	0640	MIST, STEAM, VAPOR, FUME
0220	WEATHER *(ICE, RAIN, HEAT, ETC.)*	0641	WELDING FUMES
0230	FIRE, FLAME, SMOKE *(NOT TOBACCO)*	0650	PARTICLES *(UNIDENTIFIED)*
0240	NOISE	0700	CHEMICAL, PLASTIC, ETC.
0250	RADIATION	0711	DRY CHEMICAL - CORROSIVE
0260	LIGHT	0712	DRY CHEMICAL - TOXIC
0270	VENTILATION	0713	DRY CHEMICAL - EXPLOSIVE
0271	TOBACCO SMOKE	0714	DRY CHEMICAL FLAMMABLE
0280	STRESS *(EMOTIONAL)*	0721	LIQUID CHEMICAL - CORROSIVE
0290	CONFINED SPACE	0722	LIQUID CHEMICAL - TOXIC
0300	MACHINE OR TOOL	0723	LIQUID CHEMICAL - EXPLOSIVE
0310	HAND TOOL *(POWERED; SAW, GRINDER, ETC.)*	0724	LIQUID CHEMICAL - FLAMMABLE
0320	HAND TOOL *(NONPOWERED)*	0730	PLASTIC
0330	MECHANICAL POWER TRANSMISSION APPARATUS	0740	WATER
0340	GUARD, SHIELD *(FIXED, MOVEABLE, INTERLOCK)*	0750	MEDICINE
0350	VIDEO DISPLAY TERMINAL	0800	INAMINATE OBJECT
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL	0810	BOX, BARREL, ETC.
0370	HEATING EQUIPMENT	0820	PAPER
0380	WELDING EQUIPMENT	0830	METAL ITEM, MINERAL
0400	VEHICLE	0831	NEEDLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE	0840	GLASS
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE	0850	SCRAP, TRASH
0421	DRIVER OF GOVERNMENT VEHICLE	0860	WOOD
0422	PASSENGER OF GOVERNMENT VEHICLE	0870	FOOD
0430	COMMON CARRIER *(AIRLINE, BUS, ETC.)*	0880	CLOTHING, APPAREL, SHOES
0440	AIRCRAFT *(NOT COMMERCIAL)*	0900	ANIMATE OBJECT
0450	BOAT, SHIP, BARGE	0911	DOG
0500	MATERIAL HANDLING EQUIPMENT	0912	OTHER ANIMAL
0510	EARTHMOVER *(TRACTOR, BACKHOE, ETC.)*	0920	PLANT
0520	CONVEYOR *(FOR MATERIAL AND EQUIPMENT)*	0930	INSECT
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST	0940	HUMAN *(VIOLENCE)*
0540	HOIST, SLING CHAIN, JACK	0950	HUMAN *(COMMUNICABLE DISEASE)*
0550	CRANE	0960	BACTERIA, VIRUS *(NOT HUMAN CONTACT)*
0551	FORKLIFT	1000	PERSONAL PROTECTIVE EQUIPMENT
0560	HANDTRUCK, DOLLY	1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
0600	DUST, VAPOR, ETC.		
0610	DUST *(SILICA, COAL, ETC.)*	1020	RESPIRATOR, MASK
0620	FIBERS	1021	DIVING EQUIPMENT
0621	ASBESTOS	1030	SAFETY BELT, HARNESS
0630	GASES	1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 - PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT - Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the most appropriate primary activity area *(water related, non-water related or other activity)*, the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating-powered
3. Boating-unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities *(skin diving, scuba, etc.)*
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing *(general)*
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer *(baseball, football, etc.)*
24. Sports/winter *(skiing, sledding, snowmobiling etc.)*
25. Cycling *(bicycle, motorcycle, scooter)*
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts *(fights, riots, vandalism, etc.)*
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED - If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7 - MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE - Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION - Mark appropriate box.

c. SEAT BELT - Mark appropriate box.

INSTRUCTIONS FOR SECTION 8 - PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM - Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number *(NSN)* whenever applicable.

b. OWNERSHIP - Enter ownership for each item listed. *(Enter one of the following: USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE)*

c. $ AMOUNT OF DAMAGE - Enter the total estimated dollar amount of damage *(parts and labor)*, if any.

INSTRUCTIONS FOR SECTION 9 - VESSEL/FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT - Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel floating plant.

VESSEL/FLOATING PLANTS

1. ROW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL, BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP - Select from the list below the object*(s)* that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN 0N DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10 - ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT - Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role*(s)* in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11 - CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE - Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION - Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES - Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES - Were any of the provisions of the Safety and Health Requirements Manual *(EM 385-1-1)* violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice *(including EM 385-1-1)* fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS - Was the person under undue stress *(either internal or external to the job)*? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS - Did exposure to chemical agents *(either single shift exposure or long-term exposure)* such as dusts, fibers *(asbestos, etc.)*, silica, gases *(carbon monoxide, chlorine, etc.,)*, mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation *(UV radiation created during welding, etc.)* contribute to the accident/incident?

(9**)** OFFICE FACTORS **-** Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) SUPPORT FACTORS - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources *(in terms of employee skills, number of workers, and adequate supervision)* available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?

(11) PERSONAL PROTECTIVE EQUIPMENT - Did the person fail to use appropriate personal protective equipment *(gloves, eye protection, hard-toed shoes, respirator, etc.)* for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard*(s)*? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) DRUGS/ALCOHOL - Is there any reason to believe the person's mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS - Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. If one was performed, attach a copy of the analysis to the report.

INSTRUCTIONS FOR SECTION 12 - TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? - For the purpose of this section "trained" means the person has been provided the necessary information *(either formal and/or on-the-job (OJT) training)* to competently perform the activity/task in a safe and healthful manner.

b. TYPE OF TRAINING - Mark the appropriate box that best indicates the type of training; *(classroom or on-the-job)* that the injured person received, before the accident happened.

c. DATE OF MOST RECENT TRAINING - Enter YYYYMMDD of the last formal training completed that covered the activity task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13 - CAUSES

a. DIRECT CAUSES - The direct cause is that single factor, which most directly lead to the accident. See examples below.

b. INDIRECT CAUSES - **I**ndirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.

Direct cause: failure to provide fall protection at elevation. Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee *(possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety)*; failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. *(Note: USACE vehicle was in proper/safe working condition).*

Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.

Indirect cause: failure of employee to pay attention to driving *(defensive driving)*.

INSTRUCTIONS FOR SECTION 14 - ACTION TO ELIMINATE CAUSE*(s)*

DESCRIPTION - Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/ illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15 - DATES FOR ACTION

a. **BEGIN DATE** - Enter the date YYYYMMDD when the corrective action(s) identified in section 14 will begin.

b. **COMPLETE DATE** - Enter the date YYYYMMDD when the corrective action(s) identified in section 14 will be completed.

c. **DATE SIGNED** - Enter YYYYMMDD that the report was signed by the responsible supervisor.

d.e.. **TITLE AND SIGNATURE -** Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE supervisor shall also sign the report. Upon entering the information required in 15c., 15d., 15e., 15f. and 15g. below, the responsible USACE supervisor shall forward the report for management review as indicated in section 16.

f. **ORGANIZATION NAME** - For GOVERNMENT employee accidents enter the USACE organization name *(Division, Branch, Section, etc.)* of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15d. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

g. **OFFICE SYMBOL** - Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15f.

INSTRUCTIONS FOR SECTION 16 - MANAGEMENT REVIEW (1st)

1ST REVIEW - Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15d. shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief *(2nd review)* for review and comment.

INSTRUCTIONS FOR SECTION 17 - MANAGEMENT REVIEW (2nd)

2ND REVIEW - The FOA Staff Chief *(i .e., FOA Chief of Construction, Operations, Engineering, Planning, etc.)* shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18 - SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW - The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19 - COMMAND APPROVAL

4TH REVIEW - The FOA Commander shall *(to include the person designated Acting Commander in his absence)* review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

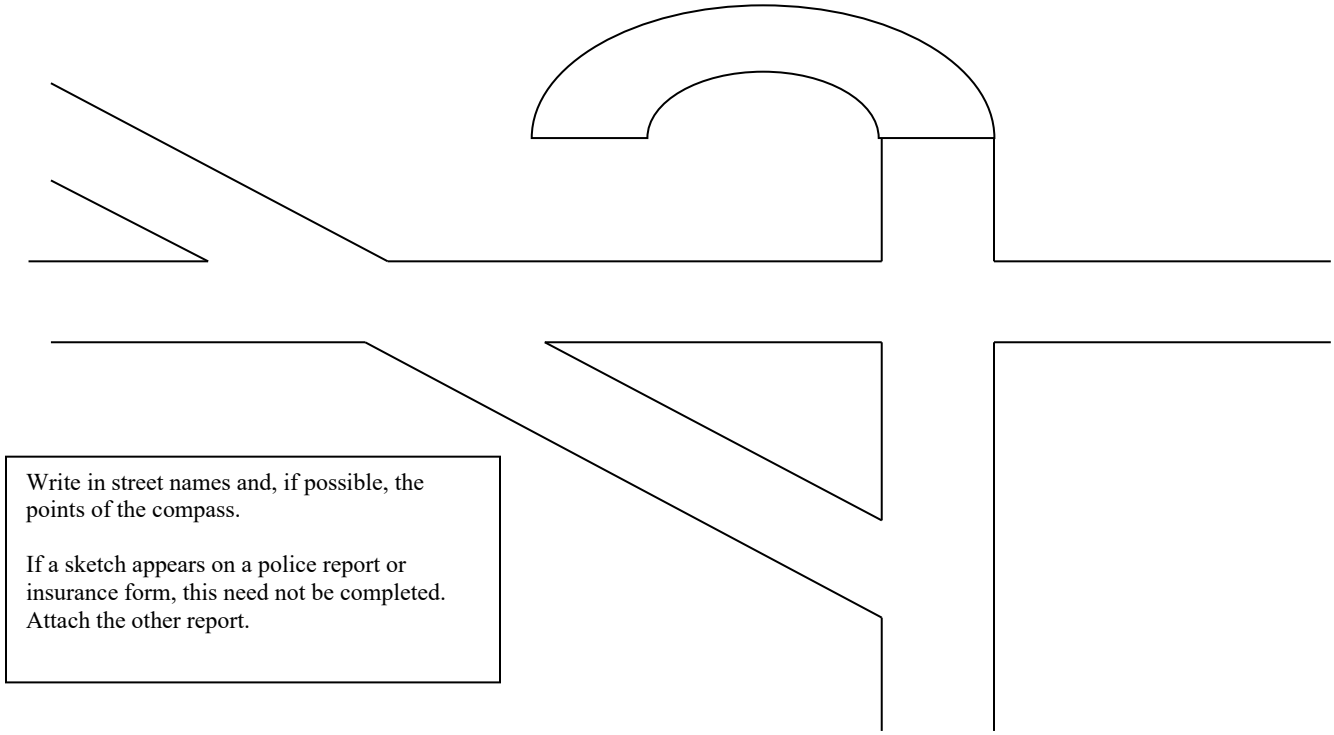
INCIDENT/ACCIDENT INVESTIGATION REPORT

TYPE OF INCIDENT - CHECK ALL THAT APPLY					
☐ INJURY/ILLNESS	☐ VEHICLE ACCIDENT	☐ FIRE/EXPLOSION			
☐ SPILL/RELEASE	☐ PERMIT EXCEEDANCE	☐ NONCOMPLIANCE			
☐ NEAR MISS					
Project/Office:		Project Number:			
Date of Incident:		Time of Incident:			
Location of Incident:					
Supervisor on Duty:		At Scene of Incident: ☐ YES ☐ NO			
Description:					

Event Sketch

INCIDENT/ACCIDENT INVESTIGATION REPORT

Vehicle Events



Write in street names and, if possible, the points of the compass.

If a sketch appears on a police report or insurance form, this need not be completed. Attach the other report.

Did Injury/Illness Result? ☐ Yes ☐ No	If Yes: Employee Name:				
Job Position:		Time In This Position:		Time w/company:	
List All PPE In Use:					
Was Medical Treatment Provided? ☐ Onsite ☐ Dr.'s Office ☐ Hospital					
Name of Person Providing Treatment:					
Address Where Treatment Was Provided:					
Type of Treatment:					
Was Property Damaged? ☐ Yes ☐ No					
Did Contamination Result? ☐ Yes ☐ No					
Describe:					
Names of Witnesses/Coworkers:					
Weather / Environmental Conditions:					
Main Cause(s):					
Indirect Cause/Contributing Factors:					
Was an AHA developed for the task being performed?		☐ Yes ☐ No		If yes, attach a copy.	

INCIDENT/ACCIDENT INVESTIGATION REPORT

NOTIFICATIONS					
Names of SES Personnel Notified:					
Names:		Date:		Time:	
Names:		Date:		Time:	
Names:		Date:		Time:	
Client Notified:					
Names:		Date:		Time:	
Names:		Date:		Time:	
Names:		Date:		Time:	

CORRECTIVE ACTION
What Corrective Actions Were Taken?
What preventative actions have been taken or will be implemented to prevent occurrence or recurrence? (List the Person(s) responsible for implementation and target completion date for each item, initial when completed)

Action No.	Preventative Action	Responsible Person	Target Date	Completed Date	Initials

Was incident reported in client's incident reporting system (if applicable)?	☐ Yes ☐ No
SHM Manager's determination of incident severity:	☐ Major Incident ☐ Minor Incident

INVESTIGATION TEAM MEMBERS				
Involved:	Name		Name	
	Name		Name	
Others:	Name		Name	
	Name		Name	
Project Manager:	Name			
SHM Manager:	Name		Signature	
Client representative(s) contacted:				

Distribution: Ensure the completed report is legible and forward to the SHM Manager.

ATTACHMENT I
RECORD KEEPING AND REPORTING

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I.3 Additional Reports 1

ATTACHMENT I
Record Keeping and Reporting

This section presents information on record keeping and reporting to support 40 CFR 264.602, which specifies reporting requirements for miscellaneous units, and 40 CFR 264, Subpart E.

I.1 Operating Record

A written operating record will be maintained for the MTR. The following information will be included in the operating record:

- Description and quantity of explosive wastes received and method and date of thermal treatment.
- Description and quantity of residue generated, sampling and analysis results, and date and location of disposal.
- Records of all residues and soils chemical analyses.
- Summary reports of any incidents requiring implementation of the Contingency Plan.
- Inspection records (for three years from date of inspection).

All records and plans will be maintained at MCAS Environmental and will be made available at all reasonable times for inspection by ADEQ and/or furnished upon request to ADEQ.

I.2 MTR Reports

The following reports will be prepared and submitted to ADEQ:

- Quarterly Progress Reports (to be submitted within two weeks after each quarter of the year)
- Annual Waste Management Performance Report (to be submitted by March 1st of each year)
- Annual Verification of Waste Analysis and Waste Minimization Certification Report (to be submitted by March 1st of each year)
- Annual Groundwater and Soil Monitoring Report in accordance with the Sampling and Analysis Plans for Soil and Groundwater Monitoring (Attachment D, Exhibits D-1 and D-2) (to be submitted by March 1st of each year)

I.3 Additional Reports

Additional reports to be submitted will include any incidences of releases, fires, or explosions requiring implementation of the Contingency Plan and documentation of facility closure.

ATTACHMENT J
CORRECTIVE ACTION SCHEDULE OF COMPLIANCE – APPROVED WORK PLANS AND REPORTS

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ATTACHMENT K

Other Federal Laws

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Exhibit K-1	Flat-tailed Horned Lizard Rangewide Management Strategy 2003 report.
Exhibit K-2	Air Quality Dispersion Modeling (Kleinfelder 2003)

ATTACHMENT K
Other Federal Laws

The following subsections provide a general overview of the federal laws referenced in 40 CFR 270.3 and assesses the relevance of each law's compliance requirements to the MTR permit.

K.1 The Wild and Scenic Rivers Act

Established in 1968, the Wild and Scenic Rivers Act (WSRA) created the National Wild and Scenic Rivers System to safeguard designated rivers in their natural, free-flowing state. These rivers are recognized for their exceptional scenic, recreational, geological, ecological, historical, and cultural significance, and are preserved for the benefit of both current and future generations.

Only two rivers in Arizona, Fossil Creek and the Verde River, have been designated as National Wild and Scenic Rivers. Fossil Creek is located in central Arizona, flowing through the Coconino and Tonto National Forests near the town of Strawberry, while the Verde River originates in the Chino Valley and winds southeast through central Arizona, passing through Prescott and Camp Verde before joining the Salt River near Phoenix (Figure K-1). Although the Colorado River flows through Yuma County, no segment of it has been officially designated under the National Wild and Scenic Rivers Act. The MTR is not located near any river designated or eligible for protection under the WSRA, and therefore no impacts are anticipated.

K.2 The National Historic Preservation Act of 1966

The National Historic Preservation Act of 1966 (NHPA), specifically Section 106 and its implementing regulations, require that before issuing a license, the Regional Administrator must, where feasible, adopt measures to mitigate potential adverse effects on properties listed or eligible for listing in the National Register of Historic Places. Compliance with these requirements involves coordination with State Historic Preservation Officers and, when appropriate, consultation with the Advisory Council on Historic Preservation following proper notification procedures.

The NHPA of 1966 applies broadly to entities and individuals involved in projects that may affect historic properties. The NHPA does not apply to the MTR because the site does not contain any properties listed or eligible for listing on the National Register of Historic Places. The NHPA's requirements pertain to federal undertakings that may affect historic properties, and no historic or cultural resources are known to be present within or near the operational boundaries of the MTR.

K.3 The Endangered Species Act

The Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) aims to protect and recover endangered and threatened species and their habitats. Under Section 7 and its implementing regulations, 50 CFR Part 402, federal agencies, including the EPA, must ensure that any authorized action does not jeopardize the continued existence of listed species or adversely modify their critical habitat. This determination is made in consultation with the Secretary of the Interior or Commerce, typically through the U.S. Fish and Wildlife Service or National

Oceanic and Atmospheric Administration (NOAA) Fisheries.

K.3.1 Integrated Natural Resource Management Plan

An Integrated Natural Resource Management Plan (INRMP) has been developed and is actively maintained for the BMGR to ensure the responsible stewardship of its natural resources while supporting the operational needs of the military. This comprehensive plan serves as a strategic framework for balancing ecological conservation with military readiness. In accordance with the Sikes Act, the INRMP is reviewed regularly to assess its effectiveness and operational relevance, with updates occurring at least once every five years. The most recent review was completed in 2023.

The 2023 INRMP addresses a wide range of updates and considerations, including changes in both military and non-military land use, evolving environmental conditions, cultural resource management, recreational access, public use policies, infrastructure such as the BMGR road system, and activities related to environmental remediation. Notably, the section on land and environmental conditions provides detailed assessments of protected species and species of concern across both BMGR-East and BMGR-West, reflecting ongoing efforts to monitor and preserve biodiversity within the range. Federally listed threatened and endangered species and species of concern for the BMGR are the Sonoran Pronghorn, Sonoran Desert Tortoise, Flat-Tailed Horned Lizard, and the Acuña Cactus.

The Sonoran Pronghorn has been classified as a federally endangered species since 1967. Its current habitat range encompasses portions of BMGR-East and the eastern section of BMGR-West. However, as illustrated in Figure 2, this range does not overlap with the vicinity of the MTR, indicating that MTR activities are unlikely to affect the species directly. The Sonoran Desert Tortoise is designated as a Species of Greatest Conservation Need (SGCN) and is known to inhabit only BMGR-East. Given that the MTR is situated outside this area, there is no anticipated impact on the tortoise from MTR operations. Similarly, the Acuña Cactus, also listed as an SGCN, has not been observed within BMGR-West and is not expected to occur there based on current ecological assessments. Therefore, the MTR poses no threat to this species. In contrast, the Flat-Tailed Horned Lizard (FTHL), another SGCN, occupies habitats such as creosote flats, sand dunes, and mud hills across southeastern California, southwestern Arizona, and northwestern Mexico, including BMGR-West. As shown in Figure 2, the MTR lies within the known habitat range of the FTHL, suggesting that military activities in this area may intersect with its ecological zone and warrant further consideration for conservation measures.

K.3.2 Flat-Tailed Horned Lizard

Although the FTHL is not federally protected under the Endangered Species Act, it holds conservation status in several jurisdictions: it is listed as threatened in Mexico, designated as a Species of Greatest Conservation Need (SGCN) in Arizona, and recognized as a Species of Concern in California. The FTHL occurs within BMGR-West and is managed in accordance with the 2003 FTHL Rangewide Management Strategy (RMS) (Exhibit K-1). These documents were collaboratively developed by multiple agencies, including the Arizona Game and Fish Department, Marine Corps Air Station Yuma, and the Bureau of Land Management. According to the INRMP, the FTHL has been petitioned for listing under the ESA on four separate occasions-1993, 2001, 2006, and 2010. However, the species was not listed, largely due to the proactive development and implementation of the RMS by BMGR-West in partnership with state and federal natural resource agencies. The ongoing commitment to the RMS has played a critical role in maintaining the species' viability and has been a key factor in avoiding federal

listing.

According to the RMS, the majority of military activities conducted on the BMGR result in minimal direct disturbance to natural habitats. These operations typically occur in areas that have already been impacted or previously disturbed, thereby reducing the likelihood of significant ecological disruption. Consequently, the overall effect on FTHLs and their habitat is expected to be limited at MTR.

To mitigate environmental impacts, the RMS establishes a comprehensive Management Program featuring proactive planning measures designed to safeguard habitat integrity. A central component involves identifying and implementing strategies to prevent habitat degradation or loss. In designated management areas, off-road military maneuvers and temporary encampments are confined to pre-approved sites to reduce ecological disruption. Other military activities are allowed only on previously disturbed lands under the jurisdiction of Department of Defense (DoD) agencies, provided they conform to standard operational protocols. While not explicitly mentioned, the MTR would be subject to these provisions.

K.4 The Coastal Zone Management Act

The Coastal Zone Management Act (CZMA), codified at 16 U.S.C. §1451 et seq., was enacted to preserve, protect, and manage the nation's coastal resources through a cooperative federal-state framework. Under Section 307(c) and its implementing regulations (15 CFR Part 930), federal agencies, including the EPA, are prohibited from issuing permits for activities that affect land or water use within a designated coastal zone unless the applicant certifies compliance with the state's approved Coastal Zone Management Program and the state concurs with that certification. If the state does not concur, the Secretary of Commerce may override the decision under specific conditions. This provision ensures that federal actions align with state coastal management objectives, promoting sustainable development and resource conservation in coastal areas.

The Coastal Zone Management Act (CZMA) does not apply to the MTR because the facility is located inland in southwestern Arizona, far outside any federally designated coastal zone. CZMA requirements only apply to activities that affect land or water use within a state's approved coastal zone boundaries, which are typically along oceanic or Great Lakes shorelines. Since the MTR is situated in a desert environment with no coastal resources or jurisdictional overlap, the CZMA's provisions such as state certification and federal consistency reviews are not triggered.

K.5 The Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA), codified at 16 U.S.C. §661 et seq., requires that the Regional Administrator consult with the appropriate state agency responsible for wildlife resources before issuing any permit that involves the impoundment, diversion, or other modification of a body of water. This consultation, subject to certain exemptions, ensures that wildlife conservation measures are considered during the planning and implementation of water resource development projects. Its purpose is to protect aquatic habitats and the species that depend on them from adverse impacts.

Activities at the MTR do not impact water resources or aquatic habitats. Its operations focus solely on the treatment and disposal of munitions and explosives. The nearest surface water body is an irrigation canal located approximately 10 miles northwest of the MTR. The MTR

neither contains nor borders any river, stream, or other water bodies designated for protection under the FWCA, and because it does not entail construction, modification, or control of water resources, the FWCA's consultation requirements do not apply.

K.6 The Clean Water Act

The Clean Water Act (CWA) is the primary federal law governing water pollution in the United States, designed to restore and maintain the integrity of the nation's surface waters. Originally enacted as the Federal Water Pollution Control Act in 1948 and significantly amended in 1972, the CWA established a comprehensive framework for regulating pollutant discharges into U.S. waters. It authorizes the EPA to set wastewater standards for industry, develop water quality criteria for pollutants, and oversee state-level water quality programs. Through the National Pollutant Discharge Elimination System (NPDES), the CWA requires permits for any discharge of pollutants from point sources into navigable waters. Additionally, the CWA supports funding for municipal sewage treatment plant construction and promotes the protection of wetlands and aquatic ecosystems. By setting enforceable standards and requiring accountability, the CWA plays a critical role in safeguarding public health and preserving environmental quality nationwide.

In regard to the MTR, there are no surface waters within or immediately adjacent to the site. The nearest surface water body is an irrigation canal located approximately 10 miles northwest of the MTR, outside the boundaries of the BMGR. The Yuma Basin receives an average annual rainfall of only 3.18 inches, while the average annual reference evapotranspiration is 81.78 inches. With the limited rainfall and high evapotranspiration rate, water falling to the ground surface can essentially only travel in a vertical cycle within the uppermost few inches of the soil surface.

During storm events, surface drainage generally flows west following local topography, while regional drainage trends north toward the Gila River, near the northern BMGR boundary, and west toward the Colorado River. Runoff initially occurs as sheet flooding over coarse-grained soils, where it is quickly absorbed through infiltration and evaporation. In areas with fine-grained soils, such as playas, water may temporarily accumulate but is eventually depleted through evaporation and slow seepage. Once runoff becomes channelized, finer sediments are transported downstream while coarser materials remain in streambeds, facilitating groundwater recharge through permeable sediments.

Given the low precipitation, high evapotranspiration rates, and soil conditions that promote rapid infiltration, combined with operational practices that include debris collection after each event, it is highly unlikely that contaminated runoff will be generated at the MTR. Furthermore, OD operations are typically conducted during dry weather, further reducing the potential for runoff.

As discussed in Attachment A.3.1, Figure A-5, the most recent FEMA National Flood Hazard Layer (NFHL) indicates that the entire MTR site lies within the 500-year floodplain, with an annual flood hazard probability of 0.2 percent (a 1 in 500 chance of flooding). Attachment A also specifies procedures to ensure that all kickouts are removed from the floodplain after the final OD event of each operating day, minimizing any residual risk.

K.7 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources-rivers, lakes, reservoirs, springs, and groundwater wells. The Act authorizes the U.S. EPA to set enforceable health-based standards, known as Maximum Contaminant Levels (MCLs), for drinking water and mandates actions to safeguard both the water itself and its sources, including rivers, lakes, reservoirs, springs, and groundwater wells.

K.7.1 Groundwater Monitoring

As part of its regulatory compliance obligations, the MTR maintains a groundwater monitoring well located just outside its southwestern boundary, downgradient of the MTR. This well plays a critical role in the facility's ongoing environmental monitoring program, serving as a critical point for detecting potential impacts on subsurface water resources resulting from treatment operations conducted within the MTR.

Groundwater samples are collected from this well annually and submitted for laboratory analysis to identify any contaminants that may have migrated from the facility. The analytical results are then rigorously compared against two key regulatory benchmarks: the Aquifer Water Quality Standards (AWQS) established by the ADEQ and the MCLs set by the U.S. EPA under the Safe Drinking Water Act. These comparisons help determine whether the groundwater remains within acceptable safety thresholds and will provide early warning of any potential contamination. The monitoring process is essential for ensuring regulatory compliance, protecting public health, and maintaining the integrity of Arizona's aquifer systems.

The MTR Groundwater well water is sampled annually and analyzed for the following contaminants:

- Explosives by EPA Method 8330,
- Nitrate/Nitrite by EPA Method 353.3,
- Perchlorate by EPA Method 6850,
- White Phosphorus by EPA Method 7580,
- Ammonia by EPA Method 1690,
- TPH-Gasoline Range Organics (GRO) by EPA Methods 5030B/8015B,
- TPH-Diesel Range Organics (DRO)/Oil Range Organics (ORO) by EPA Methods 3550B/8015AZ,
- Metals by EPA Methods 6020B/7470A,
- SVOCs by EPA Method 8270, and
- VOCs by EPA Method 8260DN

The results of the groundwater analyses are compiled and submitted annually to ADEQ as part of the Annual Soil and Groundwater Sampling Report. If any contaminant concentrations exceed the applicable AWQS or MCL thresholds, the facility is required to develop and submit a work plan for further investigation and/or remediation to ADEQ, as outlined in Attachment D of this permit. This structured approach ensures that any potential risks to groundwater quality are promptly identified and addressed.

K.8 Clean Air Act

The Clean Air Act is a U.S. federal law that regulates air emissions from stationary and mobile sources to protect public health and the environment. Originally passed in 1963 and significantly amended in 1970, 1977, and 1990, it authorizes the EPA to set and enforce air quality standards for pollutants considered harmful to humans and the environment.

K.8.1 Ambient concentrations

Under the Clean Air Act, the EPA is mandated to establish National Ambient Air Quality Standards (NAAQS) for six key pollutants known to pose risks to both human health and the environment. These pollutants include Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Matter (PM), and Sulfur Dioxide (SO_2). When an area complies with these standards, it is designated as being in "attainment," indicating that pollutant levels are within safe limits and do not threaten public health.

Particulate Matter consists of microscopic solid particles and liquid droplets suspended in the air, which can adversely affect health and the environment. PM_{10} refers to particles with diameters of 10 micrometers or less, small enough to be inhaled into the respiratory system. These particles include dust, pollen, mold spores, and other coarse materials. Due to their size, PM_{10} can cause respiratory problems, particularly in sensitive groups such as children and the elderly. Common sources include agricultural operations, road dust stirred by vehicles, windblown soil, vehicle emissions, open burning, industrial processes, and power plants. Yuma County currently does not meet the NAAQS for PM_{10} and is classified as a nonattainment area. As illustrated in Figure K-3, the MTR falls within the portion of Yuma County designated as a nonattainment area.

Ozone forms in the atmosphere through a chemical reaction between volatile organic compounds (VOCs) and nitrogen oxides (NO_x) in the presence of sunlight and high temperatures. As a result, ozone levels tend to peak in the afternoon. Because its formation depends on the interaction of these precursors, ozone pollution is typically a regional issue rather than a localized one like PM_{10}. The primary contributors to ozone precursors are motor vehicles, with secondary sources including gasoline storage and distribution facilities (for VOCs) and power plants and industrial boilers (for NO_x). Northwest Yuma County had been classified as a nonattainment area for ozone since August 2018. However, according to ADEQ, the U.S. EPA approved its redesignation to attainment status on November 19, 2025. The MTR is located outside the boundaries of the Ozone designated area.

Carbon Monoxide is primarily emitted by motor vehicles, with additional contributions from aircraft, agricultural and forestry burning, and industrial activities. CO tends to remain localized due to its buoyant nature and ability to disperse under normal atmospheric conditions. However, during stagnant air conditions, such as ground-level inversions, CO concentrations can rise, especially in winter when such inversions are more common. In the Yuma area, CO levels are expected to remain well below the NAAQS.

Sulfur Dioxide emissions mainly result from burning fossil fuels in power plants and industrial facilities. Other sources include metal smelting, volcanic activity, and transportation using high-sulfur fuels, such as ships and heavy machinery. Yuma County meets the NAAQS for SO_2 and

is considered in attainment.

Nitrogen Dioxide, like CO and SO_2, is expected to remain below the NAAQS in Yuma. It is primarily produced by fuel combustion, especially from vehicles, power plants, and off-road equipment. Currently, all counties in Arizona, including Yuma, are in attainment for NO_2.

Lead (Pb), the final criteria pollutant, was historically emitted in large quantities by vehicles using leaded gasoline. However, with the significant reduction in leaded fuel use, ambient lead levels have dropped well below regulatory standards, even in major urban centers like Phoenix and Tucson. Yuma also meets the NAAQS for lead and is in attainment.

K.8.2 Nonattainment Area

Nonattainment describes regions where air pollution levels consistently surpass the NAAQS for one or more regulated pollutants, such as O_3, PM, and CO. Each pollutant not meeting the standards is assigned a classification based on severity: Marginal, Moderate, Serious, Severe-15, Severe-17, or Extreme. Yuma County is currently designated as Moderate nonattainment for PM_{10}, meaning that PM_{10} concentrations frequently violate NAAQS thresholds.

To address PM_{10} pollution, ADEQ is developing a State Implementation Plan (SIP) specifically for Yuma. This effort follows a formal SIP Call issued by the U.S. EPA on May 17, 2022, requiring ADEQ to revise its strategy for controlling PM_{10} emissions in the area.

In accordance with the Clean Air Act, the State Implementation Plan (SIP) must include the following components:

- A detailed and current inventory of emissions.
- Air quality modeling to demonstrate how Yuma will meet federal standards.
- Legally binding regulations to reduce PM_{10} emissions.

Because portions of the BMGR lie within the designated nonattainment area, MCAS Yuma will be subject to relevant provisions of the SIP. As of 2025, the SIP remains in draft form. The MTR may be exempt from the SIP considering the current draft of the Yuma PM_{10} Open Areas and Roads Rule includes specific exemptions, such as:

"…maintenance, repair, and removal of targets and munitions associated with military tactical training; open areas on active military ranges, including designated impact areas, landing zones and bivouac areas."

Whether the finalized SIP will affect the MTR will be determined once the plan is officially adopted.

K.8.3 Air Quality

The air quality of any area is dependent upon the activities (emissions) present. With the exception of small areas that are considered nonattainment, the air quality of the MTR is generally excellent due to its vastness and lack of major pollution sources. Although ambient air quality data for the area is very limited, available data indicates that even in the more urbanized areas, levels of most of the criteria pollutants are well below the NAAQS.

Of the criteria pollutants, particulate matter may be the most directly tied to the military mission. Mobile sources, such as trucks, can contribute to the ambient concentrations of PM through the disturbance of the soil, which causes the suspension of PM, and through diesel exhaust, which is a major source of very small diameter PM. Munitions delivery may also contribute to the suspension of PM, and flash-burning of expended munitions as part of the EOD clean-up process may contribute to the ambient levels of PM. These military activities; however, are typically sporadic, wide-spread, and of short duration. Increases in the duration or magnitude of the mission are likely to have little or no impact on the air quality of the MTR.

K.8.4 Assessment of Potential Air Emission Impacts

The MTR conducts fragment, nonfragment, and white phosphorus OD. It has been demonstrated by the DoD that nearly all of the energetic materials are transformed into gaseous or particulate form in the OD treatment process. The emissions associated with the OD process are nearly instantaneous due to the nature of the treatment process. There are no structures or control systems designed to prevent or reduce emissions of hazardous constituents to the air at the MTR; however, MCAS Yuma is permitted by ADEQ to conduct OD operations at the MTR under permit ADEQ Dangerous Open Burning Permit LTF number 108486, which expires 01 May, 2026. Fugitive dust emissions are also created during OD operations. However, this would be a very localized condition of little consequence.

The emissions from explosives detonation are influenced by many factors such as explosive composition, product expansion, method of priming, length of charge, and confinement. Carbon monoxide is the pollutant produced in greatest quantity from explosives detonation. TNT, an oxygen deficient explosive, produces more CO than most dynamites, which are oxygen balanced. However, all explosives produce measurable amounts of CO when detonated. Particulates are produced as well, but such large quantities of particulates are generated in the shattering of the rock and earth by the explosive that the quantity of particulates from the explosive charge itself cannot be distinguished. Nitrogen oxides (both NO and NO2) are formed, but only limited data are available on these emissions. Oxygen deficient explosives are said to produce little or no nitrogen oxides, but there is limited data to confirm this. Unburned hydrocarbons also result from explosions, but in most instances, methane is the only species that has been reported.

An air emission modeling exercise was conducted in 2003 to estimate the potential impact to the MTR site and surrounding area from MTR operations. In order to estimate emissions, records of munitions treated at the MTR for the calendar years 2000 and 2001 and the DoD emissions database were used to estimate emissions for a hypothetical “worst-case” explosive mix that could be treated at the MTR. This explosive mix was modeled for one 3,000-pound NEW shot per hour, two shots per day, 365 days per year. Six emission scenarios were modeled by averaging period: class A and B detonations for 1-hour, 24-hour, and annual averaging periods, and white phosphorus detonations for 1-hour, 24-hour, and annual averaging periods. Results of the air modeling indicate that the air quality impacts from operations at the MTR are below the Arizona Ambient Air Quality Guideline (AAAQG) levels (or NAAQS levels for ozone and lead) for each of the averaging periods and munitions treatment scenarios. The Air Quality Dispersion Modeling Report (Kleinfelder 2003), including the air modeling protocol, is presented in Exhibit K-2.

K.9 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) serve as the cornerstone of the United States' national strategy for managing solid and hazardous waste. Enacted to protect human health and the environment, RCRA empowers the EPA with comprehensive authority to oversee hazardous waste throughout its entire lifecycle, commonly referred to as "cradle-to-grave" management. This oversight spans every phase of hazardous waste handling, including its generation, transportation, treatment, storage, and final disposal.

Under RCRA, any facility engaged in the treatment, storage, or disposal of hazardous waste, collectively known as TSDFs (Treatment, Storage, and Disposal Facilities), must comply with strict regulatory standards. These facilities are required to obtain a RCRA TSDF Permit, which ensures that their operations meet federal and state environmental protection requirements. The permitting process involves detailed evaluations of the facility's design, operating procedures, safety protocols, and environmental safeguards.

The MTR is a treatment facility managed under RCRA regulations. As such, it falls within the scope of RCRA's permitting and compliance framework. The MTR must adhere to all applicable hazardous waste management standards, including those governing the safe and lawful treatment of military munitions classified as hazardous waste.

In accordance with 40 CFR Part 270, the MTR's RCRA permit includes requirements for:

- Waste analysis plans to ensure proper identification and handling of hazardous waste;
- Contingency plans to address emergency situations and minimize environmental harm;
- Personnel training programs to ensure staff are qualified to manage hazardous materials safely;
- Inspection schedules to detect and correct potential issues promptly;
- Recordkeeping and reporting to maintain transparency and demonstrate ongoing compliance.

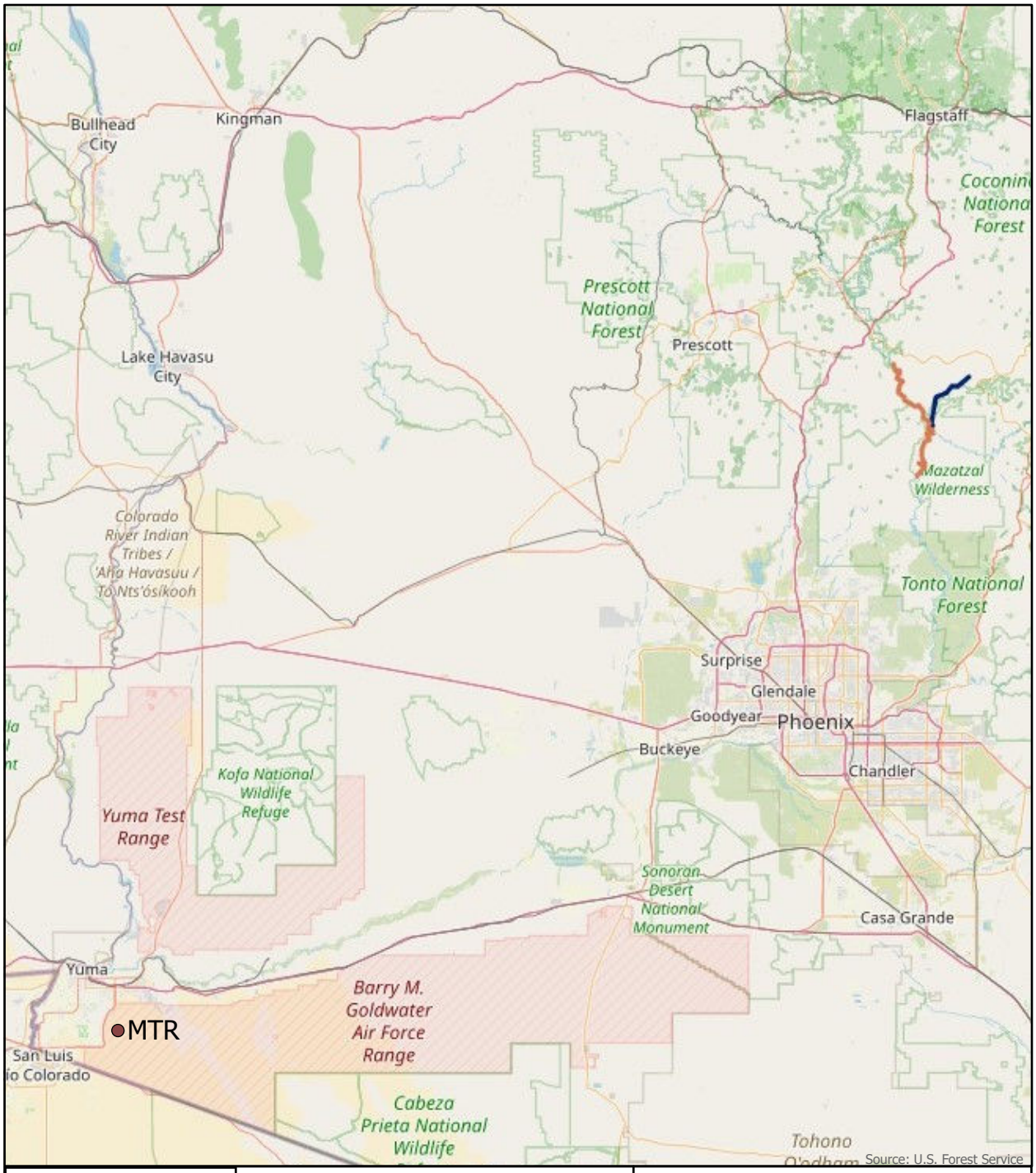
These provisions are designed to protect human health and the environment by ensuring that hazardous waste is managed responsibly throughout its lifecycle. The MTR is expected to operate in full alignment with these regulatory expectations.

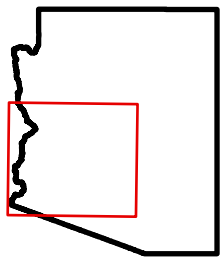
K.10 Executive Orders

There are no applicable Executive Orders that apply to the MTR.

Figure K-1

National Wild and Scenic Rivers Map





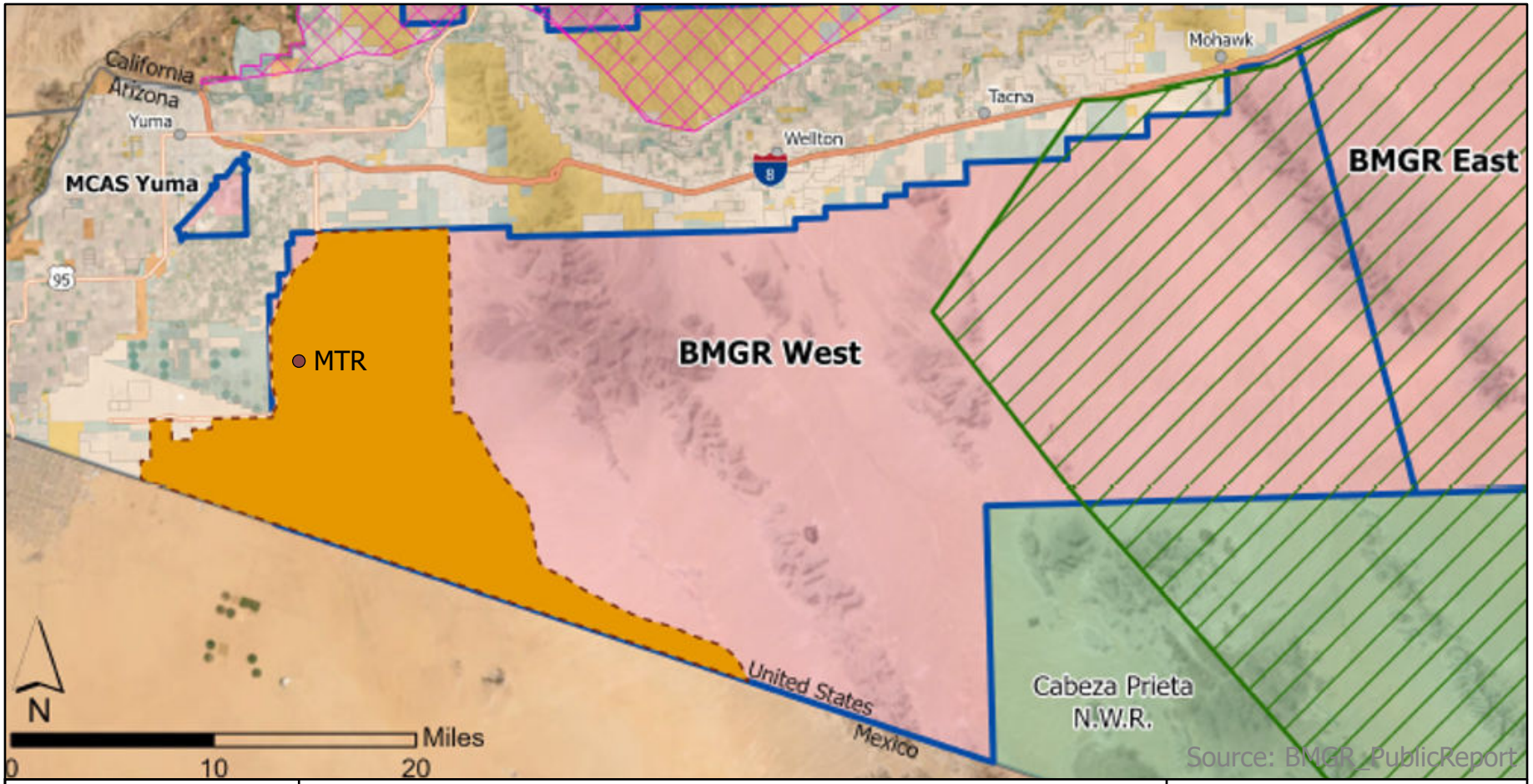
Verde River

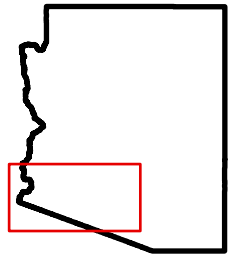
Fossil Creek

Figure K-1
Arizona National Wild and Scenic Rivers Map
Barry M. Goldwater Range

Figure K-2

BMGR West Protected Species Management Map



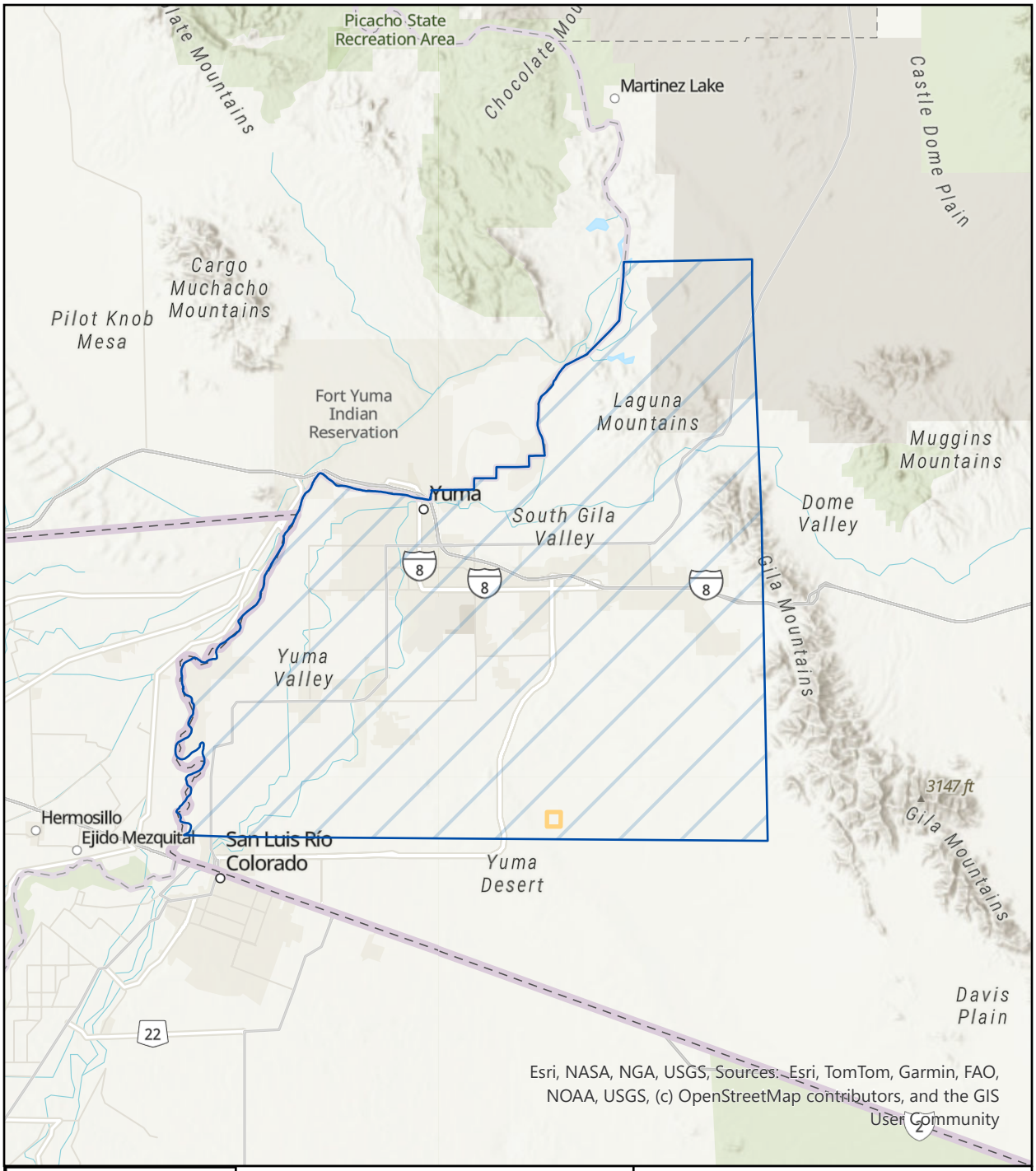


- Installations
- City/Town
- Interstate
- Highway
- BLM
- Indian Reservation
- Local or State Parks
- Military
- NPS
- Other
- Private
- State Trust
- Sonoran Pronghorn Re-establishment Areas
- Endangered Sonoran Pronghorn US Range
- Flat-tailed Horned Lizard Habitat Area

Figure K-2
Protected Species Management Map
Barry M. Goldwater Range

Figure K-3

Yuma County Nonattainment Map



PM10 - Nonattainment

MTR

Figure K-3
Yuma County
Nonattainment Map
Barry M. Goldwater Range

Exhibit K-1

Flat-tailed Horned Lizard Rangewide Management Strategy 2003 Revision

Flat-tailed Horned Lizard Rangewide Management Strategy, 2003 Revision

An Arizona-California Conservation Strategy

Prepared and edited by the

Flat-tailed Horned Lizard Interagency Coordinating Committee
May 2003

EXECUTIVE SUMMARY

The Flat-tailed Horned Lizard Rangewide Management Strategy has been prepared to provide guidance for the conservation and management of sufficient habitat to maintain extant populations of flat-tailed horned lizards (FTHLS), *Phrynosoma mcallii,* in each of five Management Areas (MAS) in perpetuity. The species is found only in southwestern Arizona, southeastern California, and adjacent portions of Sonora and Baja California Norte, Mexico.

The USFWS proposed the species for listing as a threatened species on November 29, 1993. Human activities have resulted in the conversion of roughly 49% of the historic FTHL habitat to other uses, such as agriculture and urban development. Further evaluation of populations supported by remaining habitat is necessary. While initial evidence suggested that FTHL populations had declined in the Yuha Basin and northern East Mesa (Wright 1993; USFWS 1993), Wright (2002) recently found no significant trends in lizard encounter rates in Yuha Desert, East Mesa, or West Mesa from 1979-2001. The USFWS withdrew its proposed listing on January 3, 2003, based in part on protections offered by this Rangewide Management Strategy (RMS).

The 1997 edition of the RMS established five FTHL MAS — four in California and one in Arizona. Surface disturbing activities are limited in these areas. Although land alterations in FTHL habitat outside of the MAS are not limited, mitigation and compensation measures are applied. One research area (RA) was also established to support research in an active off-highway vehicle (OHV) recreation area. Conservation areas in the Coachella Valley were also established.

Wide-scale population estimates have, to date, been unreliable. While new techniques to estimate abundance continue to be evaluated, this revised document calls for monitoring changes in distribution over time in addition to monitoring changes in population size. Revised monitoring techniques have been established.

The RMS was prepared by representatives from federal, state, and local governments. Itis designed to be used as the basis for a conservation agreement among the agencies. Signatory agencies will incorporate measures in the RMS into their land management plans. Compliance with the National Environmental Policy Act (NEPA) and other applicable federal and state law will be achieved through these management plans or revisions. The planned actions in the RMS are organized in a step-down format used by the USFWS in recovery plans.

PREFACE

Dr. Larry D. Foreman and members of the Flat-tailed Horned Lizard Interagency Coordinating Committee (ICC) prepared the original *Flat-tailed Horned Lizard Rangewide Management Strategy* in 1997. Kevin V. Young[1] and Ty J. Gardner coordinated the 2003 revision (Arizona Game and Fish Department solicitation # QF02-040-S; funds made available by the U.S. Fish and Wildlife Service). The following members of the ICC and MOG (listed by agency) participated in writing and discussion until a consensus was reached:

Agency	ICC Member	MOG Member
Anza-Borrego State Park	Paul Jorgensen	Mark Jorgensen
Arizona Game and Fish, Yuma	Lin Piest	Larry Voyles
California Department of Fish and Game	Eddy Konno	Glenn Black
California State Parks, Ocotillo Wells	Eric Hollenbeck	Curt Itogawa
U.S. Bureau of Land Management, El Centro	Gavin Wright	Greg Thomsen
U.S. Bureau of Land Management, Palm Springs	Rachelle Huddleston-Lorton	Elena Misquez
U.S. Bureau of Land Management, Yuma	Fred Wong	Gail Acheson
U.S. Bureau of Reclamation, Yuma	Andrea Campbell	Cynthia Hoeft
U.S. Fish and Wildlife Service, Carlsbad	Sandy Vissman	Pete Sorensen
U.S. Fish and Wildlife Service, Phoenix	Mike Coffeen	Jim Rorabaugh
U.S. Marine Corps Air Station, Yuma	Bryan Morrill	Ron Pearce
U.S. Naval Air Facility, El Centro	Jim Collins	Carl David
U.S. Navy SW Division, San Diego	Trish Griffin	N/A

Cover Artwork: flat-tailed horned lizard in Sonora, Mexico. Courtesy of Jim Rorabaugh.

Recommended Citation:

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[1]Young Environmental Services: 527 N. 400 E., Logan, UT 84321 flattail@biology.usu.edu (435) 755-8339

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LIST OF ACRONYMS

The following acronyms are used in this document:

ACEC.....Area of Critical Environmental Concern

AGFD .....Arizona Game and Fish Department

ABDSP .....Anza-Borrego Desert State Park

BLM .....United States Bureau of Land Management

BMGR .....Barry M. Goldwater Range

BOR.....United States Bureau of Reclamation

BP .....Border Patrol

CDFG.....California Department of Fish and Game

CNLM .....Center for Natural Lands Management

CVMSHCP.....Coachella Valley Multiple Species Habitat Conservation Plan and Natural Communities Conservation Plan

DOD .....United States Department of Defense

EA.....Environmental Assessment

FTHL .....Flat-tailed horned lizard

GIS .....Geographic Information System

ICC.....Interagency Coordinating Committee

MA .....Management Area

MCAS .....Marine Corps Air Station, Yuma

MOG.....Management Oversight Group

MOU.....Memorandum of Understanding

NAF.....Naval Air Facility

NEPA.....National Environmental Policy Act

OHV .....Off-highway vehicle

OWSVRA.....Ocotillo Wells State Vehicular Recreation Area

RA.....Research Area

ROW.....Right of Way

SVL .....Snout-Vent Length

USFWS.....United States Fish and Wildlife Service

OVERVIEW

Species Description

Taxonomy

The flat-tailed horned lizard (FTHL), *Phrynosoma mcallii*, was first described by Hallowell in 1852 as *Anota mcallii* after U.S. Army Colonel George A. M'Call who collected the type specimen (Johnson and Spicer 1985). Due to the lack of external ear openings, the FTHL was initially placed in a separate genus (*Anota*) from other horned lizards (Johnson and Spicer 1985). Norris and Lowe (1951) decided that similarities of *mcallii* to other horned lizards were greater than its differences and placed it into the genus *Phrynosoma*. The FTHL is one of 14 currently recognized species of horned lizard (eight of which occur in the U.S.) (Zamudio and Parra Olea 2000). It is believed to be most closely related to the desert horned lizard, *P. platyrhinos* (Reeder and Montanucci 2001). No subspecies of FTHL have been described (Funk 1981).

Field Characters

The FTHL has the typical round, flattened body shape of horned lizards. It is distinguished from other species in its genus by its dark vertebral stripe; lack of external ear openings; long, broad and flattened tail; and comparatively long spines on the head (Funk 1981). The FTHL has two rows of fringed scales on each side of its body. The species is cryptic in color, ranging from pale gray to light rust brown dorsally, and white or cream (unspotted) ventrally with a prominent umbilical scar. The only apparent external difference between males and females is the presence of enlarged postanal scales in males, typical of Phrynosomatids. Maximum snout-vent length (SVL) for the species is 87 mm (Boundy and Balgooyen 1988), but 65-80 mm SVL is typical adult size (Young and Young 2000). Adult weight varies between 10 and 25 g. Hatchlings range from 30 to 38 mm and weigh about 1.5 g (Johnson and Spicer 1985; Young and Young 2000).

The only other horned lizard known to be sympatric with the FTHL is the desert horned lizard. The latter is distinguished from the FTHL by a combination of characters including absence of a dark vertebral stripe, an exposed tympanum, a spotted ventral surface in most individuals, a single row of fringed scales, and a narrower and less-flattened tail (Figure 1). Apparent hybrids between the two species, which exhibit a mix of morphological characteristics, have been observed near Ocotillo, California (Stebbins 1985) and on the BMGR near Yuma, AZ (Morrill, Young, pers. obs.). There has been at least one case of hybridization in captivity (Collet 2002).

Figure 1. Comparative views of *Phrynosoma mcallii (left)* and *P. platyrhinos* (right) adults and hatchlings.

Distribution and Habitat Status

The FTHL has the most limited distribution of any horned lizard species in the U.S. (Stebbins 1985). It is found in the extreme southwestern corner of Arizona, the southeastern corner of California, and adjoining portions of Sonora and Baja California, Mexico (Figure 2). In Arizona, the FTHL is found in southwestern Yuma County south of the Gila River and west of the Butler and Gila mountains. Estimates of historic habitat in Arizona range from 203,520 to 221,043 acres, and of current habitat from 135,900 to 176,000 acres (Johnson and Spicer 1985; Rorabaugh *et al*. 1987; Hodges 1995, 1997; Piest and Knowles 2002). Suitable habitat is found east and south of the city of Yuma outside of the Colorado and Gila River floodplains and adjoining croplands. Lands within the range of the FTHL in Arizona include federal lands administered by the Department of Defense (DOD) through Marine Corps Air Station at Yuma (MCAS-Yuma), the Bureau of Land Management (BLM), and the Bureau of Reclamation (BOR); state of Arizona lands; and private lands. The majority of the FTHL's range in Arizona is on the western Barry M. Goldwater Range (BMGR), managed by MCAS-Yuma. Records from Mexico Highway 2, just south of the International Boundary, suggest the species might be present in the area of Pinta Sands on the Cabeza Prieta National Wildlife Refuge, but searches in this area have only documented desert horned lizards (Rorabaugh 1996a, 1997).

The historical range of the FTHL in California encompasses approximately 1.8 to 2.2 million acres, primarily in Imperial County, but also in eastern San Diego County and central Riverside County (Turner *et al.* 1980; Rado 1981; Bolster and Nicol 1989; Hodges 1997). However, about 50% of the land within this range is now unsuitable, including the Salton Sea and urban and agricultural areas (Hodges 1997). Areas identified as especially important to the species in California encompass approximately 210,000 acres and are found primarily in four regions (Rado 1981; Turner *et al.* 1980). MAs were established in these areas and have been the focus of FTHL habitat conservation (see Management Areas, p. 49). The El Centro Resource Area (BLM, California Desert District) administers three of these areas: West Mesa MA, East Mesa MA, and Yuha Desert MA (the BLM and the U.S. Navy jointly manage portions of West Mesa and East Mesa). The California Department of Parks and Recreation (CDPR) manages Ocotillo Wells State Off-Highway Vehicle Area (OWSVRA) as a RA and a portion of Anza-Borrego Desert State Park (ABDSP) as the Borrego Badlands MA.

The northern margin of the species' range is in the Coachella Valley, an area where expansive agricultural and urban development has destroyed the vast majority of original FTHL habitat. The largest remaining, unfragmented habitat patch is approximately 3,900-4,200 acres in size, just 3-4% of the original habitat extent within the Coachella Valley (Barrows 2002). The Coachella Valley Multiple Species Habitat Conservation Plan and Natural Communities Conservation Plan (CVMSHCP) will protect approximately 44.5% of the remaining FTHL habitat in the valley.

Based on Figure 2, about half of the historical range of the FTHL is in Mexico, particularly in Sonora. In Baja California Norte, the range extends from the International Border west of Mexicali south to Laguna Salada. A specimen found south of Laguna Salada in 2001 (Rodriguez 2002) extended the known southern range limit in Baja by approximately 40 miles. It is unknown whether this population is connected to those to the north or is disjunctive. In Sonora, the species has been found in the sandy plains immediately south of and contiguous with habitat in Arizona, and east through the Pinacate Region to the sandy plains around Puerto Peñasco and Bahía de San Jorge (Johnson and Spicer 1985; Gonzáles-Romero and Álvarez-Cárdenas 1989; Rodríguez 2002). The FTHL is probably absent from the volcanic areas in the Pinacate Region and rare in the dune fields of the Gran Desierto (Rodríguez 2002).

Map Creation

The current and historical distribution map (Figure 2) is designed to provide graphic representation of the approximate current and historical FTHL range boundaries. This map is not based on a predictive model, with the exception of the current range in the Coachella Valley (see below), and should not be viewed as such. ArcView (ESRI 1998) shape files (.shp) for the current and historical distributions recognized in this document are on file with ICC member agencies.

The historical distribution is based on a 750-foot contour interval across the majority of the range, particularly in the U.S. and the most northern portion of Mexico. There are several departures from this contour: 1) along the eastern boundary of the Algodones dune system the boundary is based on a microphyll/desert dry wash habitat (coverage provided by BLM-El Centro) because the habitats to the east of these are not likely to have been occupied by FTHLS at any time (contra Hodges 1997); 2) the boundary on the eastern side of the Yuma desert MA was defined as the edge of the rocky substrate, estimated as a fixed distance from the western slope of the Gila mountains,

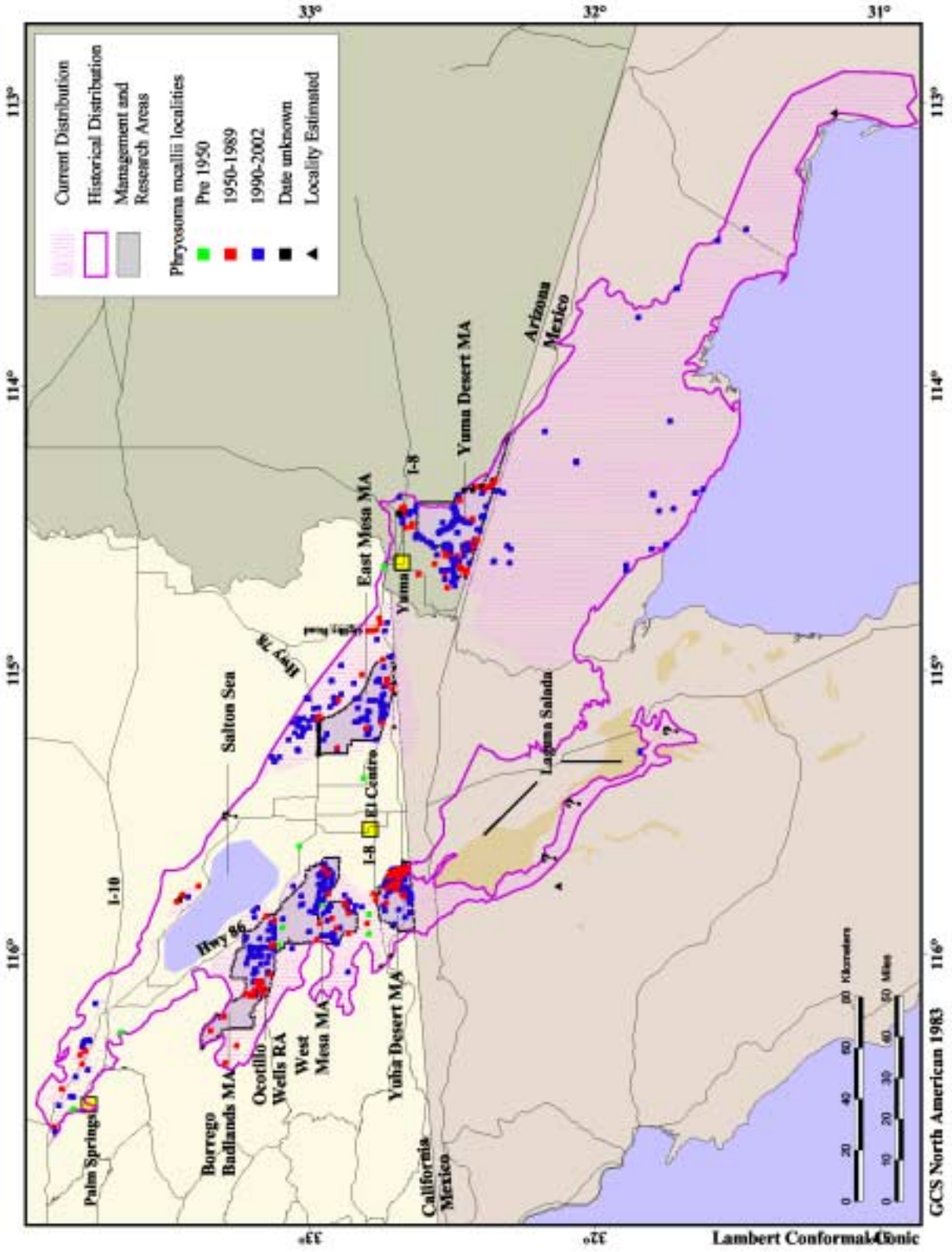
since this habitat is not occupied by FTHLs (Hodges 1995, Young and Young 2000); 3) much of the range in Sonora, Mexico is based on an ArcView coverage (obtained from http://data.geocomm.com) that delineates the boundaries between unconsolidated substrates (included) and inundated areas (excluded), but areas outside the unconsolidated substrates were included (e.g. mudhill habitat near El Golfo) where verified locality data were available (Rodríguez 2002); and 4) the distribution around Laguna Salada is based on the range map in Foreman (1997), recent localities (Rodríguez 2002) and mention of sightings on the eastern side where sand accumulates against the Sierra Cucapa (Lee Grismer, California State University San Diego, pers. comm.).

The current distribution (except the Palm Springs area) is a subset of the historical range map from which habitat that has been converted to urban, agricultural, or other such permanent disturbances has been removed. Data used to remove such areas include USGS maps, ArcView coverages of city streets, and aerial photographs of the East Mesa, West Mesa, and Yuha Desert MAs and surrounding areas (provided by BLM-El Centro). Features removed include, but are not limited to: Yuma, AZ; Ocotillo, Borrego Springs, and Salton City, California; the agricultural areas of the Imperial Valley, California and the Mexicali Valley, Baja Norte; and projects recognized on aerial photos in the Yuha Desert MA, north of the Yuha Desert MA, and near the Salton Sea Test Base.

The current distribution in the Coachella Valley area (Riverside Co., California) is the October 2002 draft (provided by the Coachella Valley Association of Governments) of the predicted portion of a FTHL habitat model produced for the CVMSHCP. This model includes habitat below the 700-foot contour interval. The model was refined by looking for vegetation community and soil type associations and deleting developed areas. The model includes habitat patches that are too small to maintain viable populations (Cameron Barrows, Center for Natural Lands Management (CNLM), pers. comm.). Further information is available through the Coachella Valley Association of Governments.

Further work is necessary to solidify the current distribution of the FTHL in the U.S. and Mexico. In particular, work is needed outside the MAs to firmly delineate the boundaries on the exterior portion of the range in the U.S. Such work, in conjunction with surveys within MAs, could help produce a habitat model that may more accurately describe the historical and current FTHL range. Areas of Mexico that remain uncertain and could benefit from further surveys and/or modeling include: 1) the southeast boundary in Sonora; 2) the extent of historical range in the Mexicali valley and the current range surrounding that area (including Mesa Andrade); 3) the extent of the current and historical ranges surrounding Laguna Salada; and 4) the degree of connectivity between portions of the current and historical ranges in Sonora, the Mexicali Valley, and surrounding Laguna Salada.

Figure 2. Approximate current and historical distribution of the flat-tailed horned lizard.



Habitat Use

Flat-tailed horned lizards occur entirely within the Lower Colorado River Valley Subdivision of Sonoran Desert Scrub (Turner and Brown 1982), the largest and most arid subdivision of the Sonoran Desert. Annual precipitation varies from 5.8 cm at El Centro, California to 13.5 cm at Palm Springs. Summer daytime temperatures range from 30 to 45°C.

Most records for FTHLs come from the creosote (*Larrea tridentata*)-white bursage (*Ambrosia dumosa*) series of Sonoran Desert Scrub (Turner and Brown 1982). It is this open community in association with sandy flats and valleys that is often described as FTHL habitat (Stebbins 1985; Turner and Medica 1982; Rorabaugh *et al.* 1987). Although most records for the species are from sandy flats or areas with a veneer of fine, windblown sand, the FTHL has also been collected or observed in areas with little or no windblown sand, such as badlands in the Yuha Basin and the Borrego Valley, and on saltbush flats at the northeastern end of the Salton Sea (Turner *et al.* 1980; Wone and Beauchamp 1995a). The species has also been recorded in the mixed scrub series within the Lower Colorado River Valley Subdivision of Sonoran Desert Scrub (Turner and Brown 1982), on gravelly soils in ABDSP, and in association with senita cactus (*Lophocereus schottii*) in Sonora. FTHLs apparently occur at low densities in parts of the Algodones dune fields (Luckenbach and Bury 1983; Wright, pers. obs.) and are probably rare in the unvegetated portions of other major dune systems (Luckenbach and Bury 1983; McCalvin 1993; Rodríguez 2002; Turner *et al.* 1980).

In California, the species has been recorded in a comparatively broad range of habitats, including sandy flats and hills, badlands, salt flats, and gravelly soils. In Arizona, the species is apparently restricted to sandy and hardpan flats. This may be due to habitat availability rather than FTHL habitat preferences. In Arizona, the presence of big galleta grass (*Pleuraphis rigida*) was correlated with FTHL abundance and may be an important vegetation component of its habitat (Rorabaugh *et al.* 1987). However, big galleta grass is not present in many high-density FTHL areas in California (Turner and Medica 1982; Rorabaugh *et al.* 1987). In California, Muth and Fisher (1992) found both white bursage (*Ambrosia dumosa*) and indigo bush (*Dalea emoryi*) were correlated with FTHLs, presumably because of their ability to trap wind-blown sand and provide shade for thermal cover. In the badlands habitat at OWSVRA, FTHL commonly use rocks as basking sites and for cover, primarily along the ridges of the hills (Setser 2001). In the Coachella Valley, FTHL are found in high densities in areas with saltbush (*Atriplex canescens* and *A. polycarpa*). The saltbush consistently produces seeds each fall, even in drought conditions, which may account for elevated ant populations and higher FTHL densities in this habitat (Cameron Barrows, CNLM, pers. comm.). A sampling of FTHL habitats is shown in Figure 3.

Although the desert horned lizard occurs sympatrically with the FTHL, subtle differences have been described in preferred microhabitat use by both species in close proximity. Rorabaugh *et al.* (1987) characterized desert horned lizard habitat as gently sloping alluvial terrain dominated by washes vegetated with small trees such as palo verde (*Parkinsonia microphylla*) and ironwood (*Olneya tesota*). FTHL habitat in the near proximity was described as consisting of finer sand, more level and unbroken terrain, and sparser creosotebush-bursage vegetation than the habitat of the desert horned lizard (Hodges 1995; Young and Young 2000).

Figure 3. Typical flat-tailed horned lizard habitat from various parts of its range.

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a) Yuma Desert MA

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b) Coachella Valley Preserve

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c) East Mesa MA

©T. Gardner

d) Ocotillo Wells RA

Food Habits

Ants constituted 97% of the prey items in FTHL stomachs examined by Pianka and Parker (1975) and scats examined by Turner and Medica (1982). The percentage of ants in their diet is greater than other horned lizards (Pianka and Parker 1975). Harvester ants (in the genera *Messor* and *Pogonomyrmex*) are far more important in the diet than smaller ant species (Turner and Medica 1982), and *Pogonomyrmex* are twice as common as *Messor* in the scats of FTHL on the Yuma Desert MA, AZ (Young and Young 2000). Studies in California (Turner and Medica 1982) and Arizona (Turner and Medica 1982; Rorabaugh *et al.* 1987) showed positive correlations between FTHL scat abundance and number of harvester ant nests.

While FTHLs feed almost exclusively on ants from day to day, occasional outbreaks of other insects may provide important feeding opportunities. For example, Mark Fisher (Boyd Deep Canyon Desert Research Center, pers. comm.) observed FTHLs gorging on sphinx moth larvae. Young (unpubl. data) examined the stomach of one road-killed FTHL and found it full of small beetles, which at the time were very abundant. Piest (pers. obs.) observed several instances in one morning where FTHLs were feeding at termite casings. While such feeding opportunities are short-lived, they may allow for quick building of fat reserves.

Like other carnivorous desert lizards, FTHLs primarily use preformed water (water found in their food) to maintain proper water balance (Schmidt-Nielsen 1964). Freestanding water is not usually available in FTHL habitat. Dew, which is used as a water source by lizards in other climates, is uncommon in southwestern deserts. It normally occurs at cool temperatures and evaporates before lizards become active enough to use it (Schmidt-Nielsen 1964). The use of free water by FTHLs is debatable. Mayhew (1968) states that FTHLs have never been seen drinking water in the wild or in captivity. However, Johnson and Spicer (1985) and Young (pers. obs.) witnessed captive FTHLs drinking water that was sprayed on their heads.

Reproduction

Flat-tailed horned lizards are oviparous (egg-laying) and early maturing, and they can produce multiple clutches (Howard 1974). Under favorable conditions, two cohorts of hatchlings may be produced in late July and in September (Muth and Fisher 1992), but in dry conditions only the late season clutch may be produced (Young and Young 2000). Hatchlings from the first cohort in July may reach sexual maturity after their first winter season, whereas hatchlings born later may require an additional growing season to mature (Howard 1974).

Compared to most other horned lizards, FTHLs produce relatively small clutches, ranging from 3 to 7 eggs with a mean clutch size of about 5 (Howard 1974; Pianka and Parker 1975). Howard (1974) developed a productivity index as a product of the number of egg clutches per year and the average number of eggs per clutch. The FTHL productivity ranked the lowest among the horned lizards studied, followed by the desert horned lizard. Howard (1974) suspected that very high temperatures and high aridity experienced by both species resulted in their lower reproductive potential. High aridity may also pose problems for nest construction. In 2000, two nest sites were found at OWSVRA, at depths of 14 cm and 26 cm, both times a few centimeters deeper than the point at which the substrate became visibly moist (Setser 2001). Two nest sites were also found on the Yuma Desert MA in drier weather conditions. One was at a depth of 90 cm and the other was at a depth of 80 cm. Again, the nest sites were a few centimeters below the level at which the

sand became visibly moist (Young and Young 2000). An even sex ratio was documented in populations in California (Turner and Medica 1982; Muth and Fisher 1992).

Behavior

Unlike other iguanid lizards, which often flee when approached, FTHLs generally remain still (Wone and Beauchamp 1995a), or may bury themselves in loose sand (Norris 1949; Young and Young 2000). This reluctance to move when disturbed, together with cryptic coloration and flattening of the body, makes them very difficult to locate in the field and very susceptible to road mortality.

FTHLs studied by Muth and Fisher (1992) spent 54% of the day in some form of movement. Most activity occurred throughout the mid-day in spring and fall. As summer temperatures increase, FTHLs shift to two activity periods, morning and evening (Mayhew 1968).

During the active season, FTHLs most often spend the night exposed on the surface, but occasionally shuffle under the sand or enter a burrow (Klauber 1939; Smith 1946; Muth and Fisher 1992; Young and Young 2000). When daytime surface temperatures approach 120°F (50°C), individuals retreat into burrows, at least some of which are of their own making (Rorabaugh 1994), but do not exhibit summer dormancy, even during drought conditions (Young and Young 2000). In Arizona, these daytime burrows were found to be straight, 70-80 cm long, and 25-30 cm deep (Young and Young 2000). The availability of burrows, or soils friable enough for burrow construction, may be a necessary habitat component for FTHLs (Muth and Fisher 1992; Rorabaugh 1994).

Muth and Fisher (1992) reported winter dormancy for FTHLs from mid-November until mid-February, but Setser (2001) noted some animals becoming dormant in mid-October. Mayhew (1965) found the majority of adult FTHLs hibernated in burrows they had dug within 5 cm of the surface. All winter-dormant FTHLs found by Muth and Fisher (1992) were within 10 cm of the surface. According to Mayhew (1968), adult FTHLs are obligatory hibernators. He suspected that reduced food availability, as well as decreasing photoperiod and lower metabolic rate resulting from reduced temperature, is the hibernation triggering mechanism (Mayhew 1965). In his study of FTHL in the lab, adults ceased eating in the fall regardless of temperature and starved when prevented from hibernating. However, horned lizards are notoriously difficult to keep in captivity, and the starvation may have been unrelated to the need to hibernate. Hollenbeck (pers. obs.) has observed some adult FTHLs at OWSVRA active for several weeks at a time during the winter. Sherbrooke (1987) successfully raised regal horned lizards (*Phrynosoma solare*) without hibernation.

Juveniles have often been found to show winter activity in California (Muth and Fisher 1992; Cameron Barrows, CNLM, pers. comm.). Whereas adults may be able to make metabolic adjustments for hibernation, juveniles may have to remain active so their fat reserves can be supplemented throughout winter (Muth and Fisher 1992). The smaller body size of the juveniles would allow them to reach a preferred body temperature on warm winter days quicker than the larger adults (Schmidt-Nielsen 1964), and winter activity may allow juveniles to reach reproductive maturity at an earlier age (Howard 1974; Smith and Ballinger 1994).

FTHLs have unusually large home ranges for lizards their size. Allometric equations based on lizard mass would predict FTHL home ranges to be less than 0.5 acres. But at Muth and Fisher's

West Mesa study site, the mean home range size for all FTHLs with more than 18 recaptures was 6.7 acres. (Muth and Fisher 1992). At a site in the Yuha Desert, Turner and Medica (1982) estimated home ranges of 0.32 and 0.12 acres for male and female FTHLs, respectively. However, the small size of the Yuha Desert study plot (10.1 acres) combined with relatively few recaptures and a relatively short study period likely resulted in an underestimate of home range size. On the Yuma Desert MA, among 14 FTHLs that were each relocated at least 45 times over the course of the summer, the mean home range of male FTHLs was 8.8 acres. Females had a significantly smaller mean home range of 4.37 acres (Miller 1999). However, using only 10-15 locations of 45 FTHLs over 15-day time periods changed the mean home range estimate to only 0.84 acres (Miller 1999). This suggests that FTHLs in that population may not maintain distinct home ranges, but instead shift their area of use through time, thereby increasing the home range estimate with each additional location. Great variation in home range size was noted among individuals and between years (Miller 1999; Young and Young 2000). Young and Young (2000) found that in the Yuma Desert MA, FTHL home range size decreased in females during a wet year, presumably because they did not have to forage as widely to meet energetic demands. Conversely, males increased their movements in the wet year, presumably because the abundant resources allowed them to increase mate-seeking behavior. At OWSVRA, home ranges appear more stable than in the Yuma Desert MA (Setser 2001).

Population Dynamics

No definitive data exist on population dynamics. However, information from scat surveys (Rorabaugh 1994; Wright 2002) and life history studies (Muth and Fisher 1992; Young and Young 2000) suggest that densities fluctuate greatly between years and that these fluctuations may be associated with winter/spring precipitation and production of annual plants in the spring. This pattern is true for other desert lizards (see Mayhew 1967; Hoddenbach and Turner 1968; Parker and Pianka 1975). Because scat size and scat production are greatly affected by climatic conditions, scat counts may exaggerate true population dynamics (Young and Young 2000).

FTHL populations may fluctuate in response to prey availability. Harvester ant population sizes and activity fluctuate with the availability of seeds, which are correlated with the amount and timing of precipitation (Beatley 1967; Brown *et al.* 1979). Harvester ants rely on seed storage during periods of climatic stress, thus decreasing their availability as a food source for FTHLs during periods of low precipitation (Brown *et al.* 1979). In the Yuma Desert MA, it is uncommon for individual FTHLs to live more than four years, but a lifespan of at least six years has been recorded (Young, unpublished data). Mortality due to predation varies greatly from year to year (Young and Young 2000). Predation rates may also vary between habitat types, with higher yearly survivorship noted at OWSVRA than in the Yuma Desert MA (Setser 2001).

Population Viability Analysis

A FTHL Conservation Team conducted population viability analyses with the simulation models RAMAS and VORTEX (Fisher *et al.* 1998). The Team's work clarified research needs and provided some insight into the mechanisms of FTHL population dynamics. Population variables such as age-specific survivorship, fecundity, and population size; sex ratios; age at first reproduction; density dependence; stochasticity; and other variables were used in the analysis to generate information about population viability, especially extinction risk for specified time intervals.

Ideally, these analyses would define an initial population size and reserve size needed to support a viable population for a specified time interval, such as 100 or 500 years. Unfortunately, population demographics and stochasticity in possible reserves (MAS) are not adequately understood to provide this information. Generally for vertebrates, populations above 5,000 individuals are considered viable (Meffe and Carroll 1994). The goal of estimating minimum viable populations is not to maintain the *minimum* number, but to maintain populations well above that size. Each of the MAS is believed to contain viable FTHL populations.

The simulation models suggested that FTHL population viability is particularly sensitive to changes in mortality rates versus other factors. This likely explains the absence of FTHL near agricultural areas where the habitat appears good but there are increased predator densities (Young pers. obs.). Other important variables are fecundity and the effects of environmental stochasticity, such as drought and years with above average precipitation. Management practices intended to benefit FTHL have little effect on fecundity and precipitation. However, by reducing activities that result in mortality, directly or indirectly, management within reserves could increase the viability of FTHL populations. Thus, the population viability analyses suggest that actions that limit sources of mortality, versus other factors, will especially increase the chances that populations will persist into the future. Results also highlighted the need for accurate estimates of population variables, particularly age-specific clutch size and numbers of clutches produced per female annually; mortality rates, particularly for juvenile lizards; population density; and how population parameters vary over time and with precipitation or annual plant production. Better estimates of population variables would greatly enhance the value of population viability analyses in guiding the management of this species.

Threats

A variety of anthropogenic activities have altered or destroyed the landscape and native vegetation throughout much of the Sonoran Desert (Lovich and Bainbridge 1999). From the estimated historical range in the U.S. (Figure 2), the FTHL has lost approximately 49% of its original habitat (Hodges 1997). The Salton Basin had been subjected to frequent inundation from the Colorado River even prior to the accidental flooding from 1905 through 1907, and it is questionable whether this area can be considered historic habitat. If the 235,520 acres currently occupied by the Salton Sea are not considered historic habitat, the amount of habitat lost is approximately 43%. Rado (1981) estimated that about 315,000 acres of habitat in California had been lost to agricultural development and 83,000 additional acres for urban development (398,000 total acres lost). Hodges (1997) had much higher estimates, with 877,000 total acres lost to agricultural and urban development. She also noted that 24,000 acres in Arizona had been converted to agriculture and urban use. Additional unknown acreage has been degraded due to utility lines, geothermal development, sand and gravel mining, OHV use, waste disposal sites, military activities, Border Patrol (BP) activities, and roads. While initial evidence suggested that FTHL populations had declined in the Yuha Basin and northern East Mesa (Wright 1993; USFWS 1993), Wright (2002) recently found no significant trends in lizard encounter rates in Yuha Desert, East Mesa, or West Mesa from 1979-2001. Further evaluation of the status of these populations is necessary.

In Sonora, less than 20% of the habitat has been converted to agricultural, urban, or other uses. In Baja California Norte, considerable habitat loss has occurred in the Mexicali Valley where urban

and agricultural development extends from Mexicali to the Colorado River (Johnson and Spicer 1985).

Several aspects of FTHL ecology and behavior contribute to the species' sensitivity to habitat loss and degradation. Among these are the following: 1) the FTHL is distributed over a relatively small area (Figure 2); 2) relatively low clutch size may limit the ability of FTHL populations to recover from declines; 3) the large home range of the FTHL means that surface-disturbing activities may affect populations for relatively great distances from project sites; 4) FTHLs often freeze in response to danger, which makes them susceptible to mortality on roads and in other areas of activity; 5) FTHLs are found in valleys and flats where the majority of residential and agricultural development typically occurs; 6) FTHLs are susceptible to a variety of predators, many of which occur at elevated levels near agriculture or urban areas; and 7) FTHLs inhabit the most arid portions of the Sonoran Desert, in which drought is likely an important factor in population dynamics.

Agricultural Development

Conversion to agriculture eliminates FTHL habitat. Agricultural development has occurred primarily in the Imperial, Coachella, Mexicali, Borrego, and Colorado River valleys and on Yuma Mesa. Portions of the Colorado and Imperial valleys were converted entirely to agriculture many decades ago. Limited new agricultural development is continuing northward in the Imperial Valley along the edges of the Salton Sea and on Yuma Mesa. Similarly, in the Coachella Valley, development of new lands for agriculture is continuing, especially around Indio and southward adjacent to the Salton Sea. The rate of new development is relatively slow due to limitations on irrigation water.

Densities of some predators are elevated at or near agricultural lands. Relatively high densities of predators (e.g., round-tailed ground squirrel, common raven, greater roadrunner, American kestrel, burrowing owl, and loggerhead shrike) appear to result in elevated predation on FTHLs in adjacent undeveloped lands (Piest, Wong, Young, pers. obs.).

Urbanization

Urban development results in a direct loss of habitat and habitat degradation resulting from a variety of human activities. Southeastern California and southwestern Arizona are experiencing dramatic growth in human population. Most of the new urban development is occurring on agricultural lands in the Imperial, Coachella, and Colorado River valleys. However, some urban development is occurring in FTHL habitat in the Coachella Valley and Borrego Valley, California, and on the Yuma Mesa near Yuma and San Luis, Arizona. Growth is also occurring in San Luis, Sonora, including development of an 8,000-acre industrial park in FTHL habitat on the eastern end of the city. Direct impacts on FTHL habitat come from activities such as construction of commercial and residential buildings, landscaping for yards, parks, and golf courses, and road construction. Indirect effects of urbanization on adjacent FTHL habitat include route proliferation, increased OHV use, spread of non-native vegetation, and trash accumulation. Predators, such as common ravens, American kestrels, and domestic dogs and cats, also increase in urban areas, resulting in increased predation rates on FTHLs in adjacent wildlands (Bolster and Nicol 1989; Cameron Barrows, CNLM, pers. comm.).

Off-highway Vehicle Use

Over the past 20 years, there have been numerous bibliographies (e.g., Webb and Wilshire 1983) and literature reviews (e.g., Berry 1996) on the effects of OHV activity. In 1983, Webb and Wilshire (1983) published a comprehensive analysis on the impacts and management of OHVs in arid regions.

Legal OHV use falls into four basic kinds: 1) use of existing routes and trails for access and touring; 2) use of existing routes and trails by motorcycles, four-wheel drive vehicles, and all-terrain cycles as a recreational activity; 3) use of existing routes and trails for competitive vehicle events; and 4) cross-country travel in OHV "open areas."

Illegal OHV activity occurs in some areas but is limited by law enforcement, signing, and public information and education. The U.S. BP conducts patrols and rescues near the International Border that sometimes involve cross-country travel. BP OHV activity in FTHL habitat has greatly increased from 1997 to 2002 (Rorabaugh pers. comm.), but new BP practices, such as reliance on remote cameras, may reduce the amount of OHV traffic in the future (Wright 2002).

Currently, California BLM permits competitive events in the Superstition Mountains Open Area and the Plaster City Open Area on the western side of the FTHL's range. In addition, cross-country travel (or "free-play") is allowed in the BLM's Plaster City Open Area, the BLM's Superstition Hills Open Area, and the OWSVRA. Portions of these open areas support FTHL populations of various densities. However, FTHL encounter rates in BLM open areas have historically been only ¼ of those in the adjacent limited areas, suggesting an OHV related effect (Wright 2002).

The nature and extent of impacts of OHV use depends upon the kind of activity (Webb and Wilshire 1978; Adams *et al.* 1982). Most desert soils are susceptible to compaction from vehicles. Important factors determining the intensity of compaction are soil moisture, vehicle type, and amount of vehicle activity (Davidson and Fox 1974; Webb *et al.* 1978; Adams and Endo 1980). Compaction results in increased water and wind erosion and decreased water infiltration and retention. Important factors in erosion of desert soils are slope, soil particle size, and size of disturbed area (Adams and Endo 1980). Compaction of soils may negatively affect burrowing of FTHLs or the construction of ant nests. Changes in soil characteristics may affect the ability of the soil to support vegetation, resulting in decreased density, diversity, and biomass of plant cover (Davidson and Fox 1974; Webb *et al.* 1978).

OHVs may impact vegetation by physically damaging roots, stems, or whole plants (Hall 1980). The resulting decrease in biomass and/or change in species diversity may result in a reduced or degraded food base for ant prey species. In addition, decreases in plant cover will decrease protection from predators, shelter from solar heating and wind, and may affect sand accumulation and retention.

The current state of knowledge of the impacts of OHV use on the FTHL is both incomplete and inconclusive. The results of work performed by Utah State University (Setser 2001) at the OWSVRA suggest that FTHLs are found less often in areas disturbed by OHVs than in areas that were randomly selected. However, FTHLs were found within 10 m of an impact area at a frequency similar to that of random locations, suggesting that vehicle impacts may be localized. Wright (2002) and Rorabaugh *et al.* (2002) found FTHLs persisting in areas of MAs that had the greatest levels of OHV disturbance observed in California and Arizona. Wright (2002) found no consistent

relationship between vehicle impacts and flat-tailed horned lizard detection rates, but Wright and Grant (2002) noted that plots with less than 9% vehicle track coverage (n = 6) had 3.5 times more lizards than plots with greater than 9% track coverage (n= 6, p = 0.05). Substrate differences between plots was a confounding variable. These results must be interpreted cautiously since no well-controlled study has been conducted to determine effects of OHVs on FTHLs. The OWSVRA continues to support research addressing the impacts of OHV use on the FTHL.

In addition to the indirect effects noted above, FTHLs could be killed directly by being run over, either above ground or in burrows. FTHL winter burrows are shallow (average depth of 5.6 cm, range 2.6-10.0, n=6; Muth and Fisher 1992); thus, vehicles may crush burrows and lizards in burrows. Bury *et al.* (1977) found reduced biomass, density, and diversity of reptiles in heavily used areas of OHV open areas.

It has been shown that prolonged noise can adversely affect some lizards (e.g., desert iguana, Mojave fringe-toed lizard) (Bondello 1976; Brattstrom and Bondello 1983). However, it is not known whether or not vehicle noise at levels and durations anticipated in the desert negatively impact FTHLs. Effects are more likely where prolonged, loud noise occurs. A bibliography of literature on the effects of noise on animals can by found in Brattstrom (1978).

Off-road activity has increased dramatically over the last decade in the Yuma Desert, Yuha Desert, and West Mesa MAs (Wright 1993; Rorabaugh, pers. obs.). In the Yuha and southern half of the West Mesa MAs in 2001, 10.5 and 6%, respectively, of the surface area was covered by vehicle tracks (Wright 2002), which was a significant increase over 1994. Wright could not determine how much of this increase came from BP, smugglers, or recreationalists. Routes in the southern part of the East Mesa MA decreased by 45% from 1994 – 2001. In the Yuma Desert MA, off-road vehicle tracks covered 2.9% of the ground surface in the BMGR portion, and 3.4% of the surface in the 5-Mile Zone portion of the MA (Rorabaugh *et al*. 2002). The authors suspected that much of the off-road traffic was attributable to BP.

Highways, Canals, Railroads

Mobile species are commonly killed by vehicle traffic along well-traveled roads. Road mortality can significantly decrease amphibian and reptile densities along roads (Nicholson 1978a, b; Rosen and Lowe 1994; Carr and Fahrig 2001). Grant *et al*. (2001) found 87% fewer FTHLs within 0.45 mile of Highway 98 in Imperial County, California, as compared to areas farther from the road. Young and Young (2000) suggested FTHL populations would be affected within 0.3 mile of a road, with severe impacts within 0.15 mile. Such mortality could depress local populations and function as a partial barrier to movement. FTHLs are less likely to be run over on railroads, but the tracks may create a significant barrier to movements. Numerous roads and highways bisect remaining FTHL habitat. Within the Coachella Valley, I-10, a busy freeway, separates remaining populations, and smaller well-traveled roads fragment remaining habitat to the north and south of I-10. Further south in California, State Routes 86, 78, and 98, and Interstate 8 divide habitat areas. It is possible that some FTHL movement occurs across these roads, but they likely function as effective barriers to most FTHL movement. Numerous smaller roads exist throughout California that are likely to depress local populations but may allow more movement between populations than these major highways.

The Arizona Department of Transportation is developing a proposal to construct the Area Service Highway linking the Araby Road Exit on Interstate 8 and the planned commercial port of entry

just east of San Luis, Arizona. The proposed route would pass through approximately 10 miles of previously undisturbed FTHL habitat and would upgrade and pave approximately 5 miles of an existing dirt road. The new commercial port of entry may facilitate urban and industrial development, which could cause further loss of habitat on both sides of the international border.

Canals probably function as nearly absolute barriers, with FTHLs able to cross only at bridges and siphons. Some may drown in large canals as well as small agricultural drains, but the significance is unknown. Barriers to movement can create small, local populations which are susceptible to stochastic events and extinction, and which cannot be recolonized from adjacent populations (Wilcox and Murphy 1985). For example, the Andrade Mesa, a small strip of FTHL habitat in California north of croplands in Mexico and south of the All-American Canal, is effectively isolated. Highways, canals, and railroads may also facilitate urban and agricultural development, which results in further loss, degradation, and fragmentation of habitat. Within California, the Coachella Canal and the All-American Canal bisect FTHL habitat and separate populations. This likely isolates the population to the east of the Coachella Canal (including animals found in the Algodones Dunes and to the east of the dunes) from the East Mesa population.

The BOR and cooperating water districts have proposed construction of a new, concrete-lined All-American Canal adjacent to the existing unlined canal, from 1 mile west of Pilot Knob to Drop 3 of the Canal in southeastern Imperial County, California (BOR and Imperial Irrigation District 1990). Construction would destroy a linear strip of desert scrub and dune habitat approximately 400 to 600 feet in width and 23 miles in length. Approximately 725 acres of FTHL habitat would be lost (Bransfield and Rorabaugh 1993). The project currently is postponed, but is likely to occur as water needs escalate in southern California.

Military Activities

The FTHL inhabits two military installations, Naval Air Facility (NAF) near El Centro, and the western BMGR administered by MCAS-Yuma. The FTHL also occurs at the former Salton Sea Test Base. MCAS-Yuma manages 114,800 acres within the Yuma Desert MA, and NAF-El Centro manages 29,800 acres within the West Mesa MA and 8,500 acres in the East Mesa MA.

At NAF-El Centro, Range 2510 intersects the West Mesa MA and Range 2512 intersects the East Mesa MA. The training ranges are used for aircraft familiarization, air-to-air refueling, tactical air control, inert (non-exploding) bombing, inert rocket/small arms firing, air combat maneuvering, air intercept, survey flights, search and rescue flights, and air defense exercises (NAF-El Centro 2001). Three target areas within FTHL habitat are used for high, intermediate, and low altitude inert bombing and inert rocket-firing exercises, and for special weapons and conventional delivery of inert ordnance. Each target has an impact radius of up to 1,500 feet. Other activities include target maintenance, clean up of target sites, road maintenance, mobile target activity, and target and run-in-line grading. Most activity is confined to previously disturbed areas such as existing roadways and designated staging areas, so very little off-road activity is required. However, unauthorized public OHV recreation occurs in these areas.

At the BMGR, the Yuma Desert MA intersects Range 2301W which includes two targets in FTHL habitat. The targets have an impact radius of up to 1,500 feet, and are used for inert air-to-ground rockets, bombs, and strafing. Other activities within FTHL habitat include the use of precision air-to-ground lasers, explosive ordnance disposal, rifle and pistol training, and tactical landing at Auxiliary Airfield 2. Other activities include target maintenance, clean up of target sites, and road

maintenance. Most activity is confined to existing roadways and designated staging areas, so very little off-road activity occurs. The BMGR and Yuma Desert MA are immediately adjacent to the Mexican border, so undocumented alien traffic and U.S. BP off-road vehicle activity are common in the area. The BMGR portion of the Yuma Desert MA is closed to the public and patrolled by MCAS.

Most military activities result in small amounts of direct habitat disturbance, or occur in previously disturbed habitat, so effects on FTHLs and their habitat are likely to be small except where activities are concentrated. Some incendiary devices could start wildfires (see discussion of Fire as a threat on p. 19), although the Integrated Natural Resource Management Plans include measures for fire suppression. Explosion of ordnance and aircraft noise could potentially cause hearing loss in lizards at or near the noise sources (Brattstrom and Bondello 1983).

Utilities

Harm and harassment of FTHLs as well as direct habitat disturbance may result from installation and maintenance of utilities such as transmission lines, pipelines, and fiber optic cable lines. Habitat disturbance from transmission lines results primarily from installation of towers, construction and use of access routes to the tower sites, use of the tower site, use of line-pulling sites, and maintenance activities. Total direct disturbance is relatively small, usually less than 8 acres per mile. Vasek *et al*. (1975a) found in the Mojave Desert that the overall, long-term effects are a permanently devegetated maintenance road, enhanced vegetation along the road edge and between tower sites, and reduced vegetation cover under the towers, which recovered significantly but not completely in about 33 years. If crushing, rather than blading, is required, time to recovery of spur routes, tower sites, and pulling sites can be reduced. Although new access routes are usually required, sometimes transmission lines are placed along existing maintenance roads. An indirect but potentially large impact is that loggerhead shrikes and other avian predators can use the transmission lines and towers to more effectively prey upon FTHLs (Young and Young 2002).

Direct habitat disturbance from pipelines results from trenching, stockpiling of fill, refilling the trench, and moving vehicles along the corridor during construction and inspections. Total disturbance is also relatively small but greater than transmission lines (i.e., usually less than 16 acres per mile). Natural habitat restoration in the construction zone requires many decades and perhaps centuries (Vasek *et al*. 1975b).

Direct habitat disturbance from burying fiber-optic cable results primarily from the crushing of vegetation where the tracked vehicle lays the cable. The disturbed area is usually narrow (< 4 m), resulting in a small disturbance overall (usually less than 1.5 acres per mile).

Pipelines, transmission lines, or fiber-optic cables are not likely to function as barriers to movements. However, roads constructed to build or maintain these utilities may cause a proliferation of new access roads into previously undisturbed areas, resulting in off-site habitat disturbance.

Predation

Round-tailed ground squirrels (*Spermophilus tereticaudus*) appear to be the chief predator of FTHLs. They were responsible for 50% of known mortalities of transmittered FTHL on West Mesa MA in 1990-1992 (Muth and Fisher 1992), and they killed 30% of all transmittered FTHLs in 1996

and 10% of transmitted FTHLs in 1998 in the Yuma Desert MA (Young and Young 2000). However, at OWSVRA ground squirrels were uncommon and did not prey upon transmittered FTHLs (Setser 2001). Loggerhead shrikes are also important predators of FTHL (Duncan *et al.* 1994; Muth and Fisher 1992; Young and Young 2000). Other documented predators include American kestrel (*Falco sparverius*) (Duncan *et al.* 1994; Cameron Barrows, CNLM, pers. comm.), common raven (*Corvus corax*) (Duncan *et al.* 1994), burrowing owl (*Athene cunicularia*) (Duncan *et al.* 1994), sidewinder (*Crotalus cerastes*) (Funk 1965; Muth and Fisher 1992), coachwhip (*Masticophis flagellum*) (Young and Young 2000), kit fox (*Vulpes macrotis*) (Duncan *et al.* 1994; Muth and Fisher 1992; Young and Young 2000), and leopard lizard (*Gambelia wislizenii*) (Carlson and Mayhew 1988; Young 1999). Other likely predators of FTHLs include the greater roadrunner (*Geococcyx californianus*), thrashers (*Toxostoma* spp.), patch-nosed snakes (*Salvadora hexalepis*), glossy snakes (*Arizona elegans*) (Muth and Fisher 1992), and large scorpions (*Hadrurus arizonensis*) (Turner and Rorabaugh 1998). Muth and Fisher also suspected the leaf-nosed snake (*Phyllorhyncus decurtatus*) was a possible predator, but recent evidence (S. Gardner 2002) suggests this is unlikely. Predator densities are often elevated near human development (Bryant 1911). For example, data from the Breeding Bird Survey show that populations of common raven have increased 4.7-fold in the Colorado Desert between 1969 and 1988 (BLM *et al.* 1989). Cameron Barrows (CNLM, pers. comm.) documented high predation rates from a kestrel pair nesting in a palm tree just outside the Coachella Valley Preserve. He also noted severely depressed FTHL populations within 0.1 mile of a road in the Coachella Valley, a result of predation by kestrels and shrikes that nested in nearby housing areas and golf courses and hunted from power poles along the roads. Round-tailed ground squirrels and roadrunners occur at elevated densities near agricultural areas and may explain absence of FTHLs in some areas of apparently suitable habitat adjacent to agriculture (Wong & Young, pers. obs.). Elevated predation may contribute to a cumulative set of adverse effects that result in population declines in some areas.

Energy and Mineral Extraction

Mining and Mineral Material Extraction

Mining and mineral extraction activities cause habitat loss and degradation because of long-term loss of vegetation cover and removal of topsoil. Associated activities, such as truck and light vehicle traffic, can result in direct mortality within the project area as well as outside of the project site along access roads. Even though most mineral material sites (e.g., sand and gravel) are small, their cumulative effect can be significant. The acreage of mining and mineral sites within FTHL MAs has not been mapped and quantified.

Geothermal Power Development

Geothermal power development is occurring in the Imperial and Mexicali valleys, particularly in agricultural lands, but also in adjacent desert lands. Much geothermal development has occurred in FTHL habitat in the southwestern portion of East Mesa. Power plant construction, wells, pipelines, transmission lines, and service roads cause habitat loss and degradation. Currently, geothermal energy companies believe that the geothermal resource is exploited at or near capacity (Rob Waiwood, Geologist, BLM California Desert District, pers. comm.). No additional power plants are proposed for East Mesa. Some additional disturbance will occur from replacement wells and associated facilities (e.g., pipelines).

Oil and Gas Development

Extensive leasing by the federal government of oil and gas rights occurred in the early 1980's in the Salton Sea Trough. Some leasing also occurred in the Yuma Desert south of Yuma. These leases were highly speculative. Only one test well was drilled in California, and two test wells were drilled in Arizona. None of these wells were profitable, and no oil or gas resources have been identified. At present there are no active federal leases for oil and gas within the range of the FTHL in the U.S.

Potentially, portions of public land within the range of the FTHL could be offered for lease in the future. Leasing, which is discretionary, would not take place unless interest had been expressed by the oil and gas industry. Any leasing would be required to adhere to regulatory standards (43 CFR 3100 et seq.). Oil and gas leases may be issued with standard stipulations as well as additional stipulations for sensitive areas, including stipulations requiring no surface occupancy.

The development of an oil and gas field would result in loss or degradation of habitat from well pads, pipelines, and service roads. Some direct mortality could occur on roads used by trucks and other vehicles. Under current regulations the amount and location of disturbance on federal lands would be subject to strong controls.

Wind Turbines

Wind turbines cover about 317 acres of FTHL habitat in the northwestern portion of the Coachella Valley. Some habitat is lost where turbine platforms are built, and there may be some road mortality on the dirt maintenance roads. However, the turbines have mainly been built on gravel floodplains and foothill slopes, where FTHLs are unlikely to occur. Furthermore, there may be an indirect positive effect in that the presence of wind turbines keeps the habitat from being converted to urban use, which is the primary cause of habitat loss in the Coachella Valley. The turbines may also reduce densities of avian predators.

Landfills

In recent years there have been increasing attempts to place large, regional landfills serving distant urban centers in remote areas, such as the Colorado Desert. The proposals range from 2,000 to 20,000 acres in size. Large landfills in FTHL habitat would result in a permanent loss of habitat. Additional degradation of habitat as well as direct mortality and population fragmentation would occur from trash transportation, such as railroads and roads, and ancillary facilities. Although strongly stipulated to limit the effect, landfills may increase populations of predators (e.g., ravens, roadrunners) that potentially could prey on FTHLs many miles from the landfill.

In the past, the federal government issued leases to cities and counties for landfills serving local areas. Currently, federal agencies are disposing of, primarily through exchange or sale, lands proposed for landfills. Local agencies may still develop new sites on private lands in wildland areas. Even though relatively small in size (10-200 acres), these landfills would result in negative effects on FTHLs similar to large, regional landfills.

BOR sold 640 acres of land south of Yuma to the city of Yuma for a regional landfill prior to the Conservation Agreement. The land is located just east of the Arizona state prison along County 23rd Street. It is currently undeveloped and occupied by FTHLs. This landfill will replace the existing Yuma County landfill located east of Somerton, when that landfill reaches capacity.

Exotic Plants

Many species of introduced, non-native plants occur in FTHL habitat. Most are Mediterranean or Asian annual species that germinate in the winter or spring months. Split grass (*Schismus barbatus*) is common throughout the range of the FTHL and locally abundant. Sahara mustard (*Brassica tournefortii*) and Russian thistle (*Salsola tragus*) are locally abundant. Sahara mustard appears to be spreading rapidly in some areas. Many other non-native annual species may be present, especially species in the families Gramineae (grasses), Chenopodiaceae (goosefoots), Cruciferae (mustards), and Compositae (sunflowers), particularly near agricultural areas and near streams or wetlands. Density, diversity, and productivity of both native and non-native annual plants vary greatly from year to year. In years with abundant winter and spring rainfall, densities and diversity of annual plants are often relatively high (Tevis 1958; Inouye 1991; Rorabaugh 1994).

The effects of non-native annual plants on the FTHL are unknown. However, their abundance in FTHL habitat is of concern for several reasons. In portions of East Mesa, the Coachella Valley, and habitat in Sonora, densities of Russian thistle and/or Sahara mustard are very great in some years, with stem or culm densities perhaps great enough to impede movement by FTHLs, which are relatively wide-bodied and active. As discussed in the following section on fire, high productivity of non-native annuals can fuel fires that destroy native perennial shrubs and facilitate changes in plant composition.

Where non-native annuals have significantly changed plant communities, the types of food available to harvester ants have also been altered. Relationships among species of harvester ants and between ant populations and environmental variables are complex (Ryti and Case 1988; Mackay 1991). Changes in annual plant communities may trigger changes in ant communities that could, in turn, affect predators of ants, including FTHLs.

In addition to non-native annual plants, saltcedar (*Tamarix ramosissima*), a non-native perennial shrub or tree, has invaded areas of shallow groundwater in FTHL habitat on the west side of West Mesa, in the Yuha Basin (Wright 1993), and along portions of the All-American and Coachella Canals. FTHLs have been recorded in saltcedar communities (Kim Nicol and Betsy Bolster, CDFG, pers. comm.), but dense stands of saltcedar are likely unsuitable for them.

Fire

In the summer of 1992, a dense, dried stand of non-native annual plants fueled a fire in northern East Mesa that burned approximately 3,600 acres. Although the effects of the fire have not been quantified, large numbers of perennial shrubs, particularly creosote, were killed. Restoration of perennial cover after the fire has been very slow. Dried, non-native plants in the Coachella Valley have also fueled several small fires of less than ten acres. Habitat in portions of the Coachella Valley, on East Mesa, and in Sonora support dense stands of non-native annuals and, as a result, is particularly susceptible to fire. Presumed ignition sources of fires within habitats occupied by FTHLs include: lightning strikes, campfires, highway and railroad sources, catalytic converters on OHVs, military activities (particularly use of flares and bombing), and other activities. Fires are more frequent near towns and roads (Tracy 1994) and are likely to occur after annual plants cure in the spring and before late summer or winter rains reduce the fire hazard.

The effects of fire on FTHL habitat have not been studied. However, many species of perennial shrubs in desert scrub habitats are generally poorly adapted to fire (Brown and Minnich 1986; Minnich 1994). Fire in desert scrub communities causes vegetational conversion to communities that are more fire tolerant (Minnich 1994). Recovery of pre-fire cover and biomass of desert shrubs is achieved only after several decades (Minnich 1994). Creosote and white bursage, which are often dominant perennial shrubs in FTHL habitat, typically experience high mortality during fires. Big galleta grass, also an important perennial in some areas, resprouts vigorously after fire (Minnich 1994). Although fire suppression activities are needed to control the size of fires, off-highway access during fires and creation of fire lines can result in habitat damage (Duck *et al.* 1994).

If fire occurs when FTHLs are on or near the surface, individuals could be killed directly by the fire. The effects of vegetation community conversion on FTHLs are unknown, but decreased shrub cover could make individuals more susceptible to predation and environmental extremes. Changes in plant community composition could also facilitate changes in substrates and ant populations that could adversely affect FTHLs. Additional study is needed to quantify the effects of fire on this species and its habitat.

Pesticide Use

Agricultural fields in the range of the FTHL are sprayed aerially with insecticides to control various insect pests. These pesticides may drift onto adjacent wildlands and kill ants, the primary prey of FTHLs (BLM 1990). Pesticide drift is less likely to be concentrated sufficiently to kill FTHLs directly, but dosages may become lethal if accumulated in the tissues by consuming contaminated prey. Sublethal effects on lizards are poorly studied and pesticide tolerances of FTHLs are unknown (Johnson 1989). Drift of herbicides from croplands may also injure or kill plants in adjacent FTHL habitat.

Since 1943, the California Department of Food and Agriculture has conducted a control program for the exotic sugar beet leafhopper (*Circulifer tenellus*), a carrier of curly top virus, which damages crops. The program has entailed aerial application of insecticides (DDT from 1956-1965 and malathion since 1965) in areas known to harbor the insect. In the past this has included portions of East Mesa, West Mesa, and Yuha Basin in California (Calif. Dept. of Food and Agric. 1991). Historically, treatments in the Imperial Valley have occurred in about one out of every three years with aerial treatment acreage varying between 3,000 and 27,000 acres. The last two aerial treatments in Imperial County were in 1992 and 1998, with treatment acreages of 7,143 and 5,900 respectively (Calif. Dept. of Food and Agric. 2002).

Effects of malathion on the FTHL have not been studied; however, studies on other lizards have shown no direct effects at applications many times higher than planned here (Peterle and Giles 1964; Giles 1970; Hall and Clark 1982). Harvester ants, which are the primary prey of FTHLs, are killed by the insecticide treatments (Bolster and Nicol 1989). Proposed treatment protocols call for application during night or early morning hours in the winter or spring. Since most ants in a colony are underground during these cool periods, few ants should be killed directly (Calif. Dept. of Food and Agriculture 1995). Monitoring efforts have shown that, although foraging individuals may be killed in significant numbers, ant colonies recover quickly following malathion spraying (Peterson 1991; Calif. Dept. of Food and Agric. 2002). However, no rigorous studies have investigated the effects of malathion spraying on harvester ant populations within the range of the

FTHL, therefore the conclusions of these monitoring efforts are as yet unsupported. Spraying, if necessary, typically would occur at or near the time of emergence of hibernating FTHLs. This would likely affect populations in sprayed areas, because food resources (ants) would be temporarily reduced. Therefore, malathion spraying is considered inconsistent with FTHL conservation in FTHL MAs.

Despite mitigation measures, the overall effects of the program are uncertain. Effects of applying broad-spectrum insecticide over many years to desert scrub communities are potentially many and complex. For instance, changes in invertebrate communities may include changes in pollinator and herbivore populations, which may in turn alter plant communities. Changes in plant communities could precipitate further changes in invertebrate communities and create altered conditions for vertebrates, as well. The effects of this program need further study. The USFWS has issued a biological/conference opinion, and a recent update, on the beet leafhopper control program (USFWS 1996b; USFWS 2001). The terms and conditions stipulate that no treatments may occur in FTHL MAs, and that aerial treatments in habitats elsewhere that support high densities of FTHLs should be restricted to the fall and winter months to the extent possible. The most recent decision of the BLM California State Director (March 11, 2002) in authorizing a beet leafhopper malathion control program on public lands in California includes the following terms and conditions:

"9. No treatments shall be applied in designated flat-tailed horned lizard management areas, as set forth in the Flat-tailed Horned Lizard Rangewide Management Strategy (Twedt 2001). Treatments within other flat-tailed horned lizard habitats shall be limited to not more than one application in a given area per year.

10. Harvester ant monitoring shall be conducted in association with any treatments that occur in flat-tailed horned lizard habitat in the Imperial Valley."

Land Disposal

Lands that are removed from federal or state ownership are available for agricultural development, urban development, landfills, or other surface disturbing activities consistent with local zoning regulations. These activities result in varying degrees of habitat loss and adverse effects to FTHL populations.

The Arizona State Land Department is disposing of land occupied by FTHLs in two areas: 1) near Fortuna Road east of Yuma and south of Interstate 8 and 2) near the town of San Luis. The parcels of state lands that are currently being sold are immediately adjacent to residential and commercial development and have reached what the State Land Department feels is their peak value. It is expected that these lands will be developed as housing or commercial property soon after their sale and thus will no longer be useable as habitat for FTHLs. The State Land Department is currently denying land sale applications for other state land parcels in FTHL habitat because these lands have not yet reached their highest potential value. Recently, however, they have leased significant parcels of habitat for agricultural development.

Cattle Grazing

Historically, portions of FTHL habitat in the U.S. were grazed (e.g. East Mesa) as ephemeral pasturelands; however, we are not aware of any grazing currently occurring in the U.S. range of the species. Cattle grazing occurs at least seasonally in some portions of Sonora where FTHLs are

found. In dry periods, cattle congregate around water sources and corrals, such as at Pozo Nuevo, Sonora. During wet winters and springs when annual plants are abundant, cattle may stray far from water and ranchers often truck in additional stock to take advantage of abundant forage. Areas in the immediate vicinity of water are often heavily trampled and denuded of vegetation. The effects of livestock grazing on the FTHL are unknown; however, grazing can reduce populations of other lizards (Jones 1981; Bock *et al.* 1990; Mitchell 1999). Heavy grazing is widely recognized as having serious deleterious effects on desert soils, vegetation communities, and fauna; however, effects of light to moderate grazing are not as well documented (see review in Lovich and Bainbridge 1999).

Other Activities

Various specialized projects and facilities have been constructed or proposed for desert areas that provide habitat for the FTHL. As habitat is lost to these projects, populations of FTHLs are reduced accordingly. Examples of such projects are the Arizona state prison in the Yuma Desert, which occupies about 640 acres of former FTHL habitat, and the nearby A-22 site that BOR had developed prior to the Conservation Agreement for disposal of salt sludge produced by the Yuma Desalting Plant. Development at the A-22 site currently occupies about 160 acres but would be expanded to as large as 960 acres if or when the desalting plant began full-scale operation.

Listing History

In California, the FTHL was designated a sensitive species by the BLM in 1980 (BLM 1980). The purpose of the designation was to provide increased management attention to prevent population declines and habitat loss or degradation that might result in federal or state listing as endangered or threatened. The designation raises the level of concern for FTHLs in the environmental review process and in land use planning. No specific habitat or population protection measure or review process is required or prohibited by the sensitive species designation. By present BLM policy, species designated sensitive are, at a minimum, afforded the protection provided candidate species (BLM 1988). This includes direction to 1) determine distribution, abundance, and population status, 2) develop a habitat management program, and 3) coordinate with the USFWS (BLM 1988).

On January 25, 1988, the California Department of Fish and Game (CDFG) Commission received a petition requesting listing of the FTHL as an endangered species. On May 13, 1988, the Commission accepted the petition and designated the FTHL a candidate species (Carlson and Mayhew 1988). The CDFG reviewed the petition and other information and recommended in its review (Bolster and Nicol 1989) that the species be listed as threatened. On June 22, 1989, the Commission voted against the proposed listing.

The Arizona Game and Fish Department (AGFD) currently includes the FTHL on its draft list of wildlife of special concern (AGFD in prep). This designation affords no legal protection to the species, but is used in planning to encourage habitat conservation and management consideration. Collecting or killing FTHLs is prohibited in both Arizona and California, except by special permit.

The USFWS included the FTHL as a Category 2 candidate for listing as a threatened or endangered species in its original "Review of Vertebrate Wildlife" published in the *Federal Register*, December 10, 1982 (USFWS 1982). Category 2 candidate species were those for which data in the USFWS possession indicate that listing may be appropriate, but additional information is needed to

support a proposed rule. In a 1985 revision of the candidate list, the species was retained as a Category 2 candidate (USFWS 1985). Due to new data (especially Rorabaugh *et al*. 1987, Carlson and Mayhew 1988, and Olech undated), the USFWS elevated the FTHL to a Category 1 candidate in its revised list issued on January 6, 1989 (USFWS 1989). Category 1 candidate species were those for which the USFWS had sufficient information to support a proposal to list them as threatened or endangered.

On November 29, 1993, the USFWS published a proposed rule to list the FTHL as a threatened species (USFWS 1993). The USFWS cited "documented and anticipated population declines associated with widespread habitat loss, fragmentation, and degradation due to human activities such as agricultural developments, urban expansion, OHV use, energy developments, and military activities" as the primary bases for the proposed listing. The USFWS could not determine critical habitat at that time. A public meeting was held in El Centro on March 22, 1994, to gather public comment. The passage of Public Law No. 104–6, 109 Stat. 73 in April 1995 delayed consideration of listing the FTHL until an executive waiver, signed by President Clinton on April 26, 1996, allowed the Secretary of the Interior to again list species for protection under the Endangered Species Act.

In response to a lawsuit brought by the Defenders of Wildlife and others, the Secretary of the Interior was ordered by the district court in Arizona on May 16, 1997 to, within 60 days, issue a final decision on the listing of the FTHL. On July 15, 1997 the Secretary of the Interior issued a notice to withdraw the proposal to list the FTHL based on three primary factors: 1) population trend data did not conclusively demonstrate significant population declines; 2) some of the threats to the habitats occupied by FTHLs had become less serious since the proposed rule was issued; and 3) the 1997 Conservation Agreement and RMS would ensure a further decrease in threats to the FTHL and its habitat (USFWS 1997). The Defenders of Wildlife and others again filed suit against the Secretary of the Interior in district court. On June 16, 1999, the district court for the Southern District of California issued a summary judgment upholding the Secretary of the Interior's decision not to list the FTHL.

The Defenders of Wildlife and others appealed the case to the Ninth Circuit Court of Appeals, which on July 31, 2001 reversed the district court's ruling and asserted that the Secretary of Interior's decision to withdraw the FTHL from consideration for listing was "arbitrary and capricious". The primary reasoning for this decision was that the Secretary of the Interior did not adequately address the meaning of the phrase, "in danger of extinction throughout … a significant portion of its range" and how an adequate interpretation of this phrase applies to the status of the FTHL. Furthermore, the court expressed concern about the incomplete implementation of the 1997 Conservation Agreement. On October 24, 2001, the district court ordered the Secretary of the Interior to reinstate the 1993 proposed rule to list the FTHL. The proposed rule was reinstated December 26, 2001 (USFWS 2001).

On January 3, 2003, the USFWS withdrew the proposed rule to list the FTHL as a threatened species (USFWS 2003). They determined that listing was not warranted because threats to the species as identified in the proposed rule were not as significant as earlier believed, and current available data did not indicate that the threats to the species and its habitat are likely to endanger the species in the foreseeable future throughout all or a significant portion of its range.

The Mexican Government has designated the FTHL a threatened species. As such, the species is protected from collection, sale, and commerce, and its habitat is afforded special protection

(Secretaría de Medio Ambiente y Recursos Naturales 2002). An international consortium selected the FTHL and portions of its habitat as conservation priorities in an ecosystem-wide analysis (Marshall *et al.* 2000).

MANAGEMENT PROGRAM

Overall Goal

MAINTAIN SELF-SUSTAINING POPULATIONS OF FLAT-TAILED HORNED LIZARDS IN PERPETUITY.

Management Objectives

- Continue to secure and/or manage sufficient habitat to maintain self-sustaining FTHL populations in each of the five designated MAs (Yuma Desert, East Mesa, West Mesa, Yuha Desert, and Borrego Badlands MAs) and in areas designated by the CVMSHCP.
- Maintain a "long-term stable" or increasing population of FTHLs in all MAs. A population that is stable over the long term exhibits no downward population trend after the effects of natural demographic and environmental stochasticity are removed.
- Continue to support research that promotes conservation of the species at OWSVRA and elsewhere throughout the range of the species.
- Within and outside of MAs, limit the loss of habitat and effects on FTHL populations through the application of effective mitigation and compensation.
- Encourage and assist Mexico in the development and implementation of a FTHL conservation program.

Overview and Purpose

In 1994, the USFWS, BLM, BOR, DOD, and several other agencies signed a MOU "...on Implementation of the Endangered Species Act" that established a general framework for cooperation and participation among cooperators in the conservation of species tending toward federal listing as threatened or endangered under the Endangered Species Act. The MOU identified the development of conservation agreements as a valuable process for achieving conservation of species through voluntary cooperation. A conservation agreement is a formal, written document agreed to by the USFWS and other cooperators that identifies specific actions and responsibilities for which each party agrees to be accountable. The objective of a conservation agreement is to reduce threats to a candidate species or its habitat, possibly lowering the listing priority or eliminating the need to list the species.

This strategy formed the basis of a conservation agreement among the cooperators for management of FTHLs (Foreman 1997). The conservation agreement that was signed is included as Appendix 1. Although the USFWS determined that the conservation agreement was effective and that listing the FTHL was unnecessary, it retains the ability to reconsider the effectiveness of the agreement. Lack of compliance among the cooperators, a change of circumstances, or other reasons may alter the expected result of this strategy. If threats to the FTHL or its habitat are not reduced, the USFWS may proceed with another proposed or an emergency listing.

The purpose of this strategy is to provide a framework for securing and managing sufficient habitat to maintain several self-sustaining populations of the FTHL throughout the species' range in the U.S. (see Habitat Management, p. 49). A major step towards that objective was the establishment of five MAs encompassing large blocks of habitat where surface disturbing and

mortality causing activities are minimized. Prior to the RMS, management of federal lands within FTHL habitat was guided by several management plans, as discussed in Appendix 2. These plans cover federal lands both within and outside the MAs. When the MAs were established, this document became the standard for management and conservation of FTHL habitat. Signatory agencies have incorporated measures in the RMS into their land management plans to comply with the NEPA and state counterparts.

Outside of these MAs, FTHL habitat receives a degree of protection through mitigation and compensation and through the previously established habitat management plans that affect public lands outside of MAs (Appendix 2). Specifically, signatories to the conservation agreement ensure that adverse effects of projects they authorize outside of MAs are mitigated and that residual effects are compensated in accordance with a standard formula (see Mitigation and Compensation). The funds obtained through compensation are used to consolidate land ownership within the MAs or to enhance habitat.

As part of its adaptive management approach, programs for monitoring FTHL population, distribution, and habitat disturbance have been established (see Monitoring Program, p. 66 and Appendix 4 and Appendix 5). If population or distribution declines occur, the ICC shall investigate potential causes. If causes are anthropogenic in nature, the ICC shall make recommendations to the MOG for reversing the trend.

This document is the first revision of the 1997 RMS (Foreman 1997). Because the Implementation Schedule will expire in 2008, it is expected that the schedule will be revised at that time. Concurrently, the need for a revision of the entire document will be evaluated.

Planning Actions

The following Planning Actions have been developed as recommendations to signatory agencies to ensure that the goal of maintaining a "long-term stable" population within each MA is achieved. The original Planning Actions from the 1997 RMS are repeated here, though some of these actions have been completed. Actions that have been identified since 1997 have been added. It is understood that implementation of these actions is subject to availability of funds and compliance with all applicable regulations. It is anticipated that specific actions may be modified based on information obtained from future monitoring, research, and evaluations of the effectiveness of this strategy. Annual evaluations and proposed modifications of this strategy shall be coordinated through the FTHL ICC. The MOG will meet as necessary to review recommendations of the ICC and may make corresponding modifications to Planning Actions in the RMS.

1. **Delineate and designate five FTHL MAs and one FTHL RA. See Table 3 for a summary of land ownership within each MA. Boundary descriptions and geographic information system (GIS) maps are on file with land management agencies.**

   1.1. Designate the Yuma Desert FTHL MA as shown in Figure 4. If the proposed Area Service Highway is constructed along a portion of the boundary of the MA, the east and south side of the ROW will be the new western and northern boundary of the MA, as appropriate.

   1.2. Designate and complete NEPA process for the East Mesa FTHL MA as shown in Figure 5.

1.3. Designate and complete NEPA process for the West Mesa FTHL MA as shown in Figure 6.

1.4. Designate and complete NEPA process for the Yuha Desert FTHL MA as shown in Figure 7.

1.5. Designate and complete California Environmental Quality Act process for the Borrego Badlands FTHL MA as shown in Figure 8.

1.6. Designate the OWSVRA as the Ocotillo Wells FTHL RA as shown in Figure 9.

1.7. Continue to manage areas in the Coachella Valley that are capable of sustaining viable populations of FTHL by working with other agencies and organizations in finalizing a CVMSHCP (see Figure 10).

2. Define and implement management actions necessary to minimize loss or degradation of habitat.

2.1. Mitigate and compensate, as needed (Appendix 6), project impacts on FTHLs and their habitat both within and outside of MAs and the RA through humane and cost-effective measures.

2.1.1 Apply mitigation measures as appropriate, based on the nature of the anticipated impacts (see Mitigation section).

2.1.2 Require compensation for residual impacts remaining after application of other on-site mitigation measures (see Compensation section).

2.2. Limit land use authorizations that would cause surface disturbance within the MAs.

2.2.1 Land use applications will continue to be reviewed on a case-by-case basis for impacts on FTHLs and their habitat. Every attempt shall be made to locate projects outside of MAs. New ROWs may be permitted only along the boundaries of MAs and only if impacts can be mitigated to avoid long-term effects on FTHLs in the MA. Where discretionary, other new authorizations may be permitted if the habitat disturbance does not pose a significant barrier to lizard movements. Disturbance shall be limited to 10 acres or less per authorization, if possible. If individual disturbances over 10 acres are necessary, the ICC and the MOG shall be contacted to provide suggestions for minimizing potential impacts to FTHLs. The cumulative new disturbance per MA since 1997 may not exceed 1% of the total acreage on federal land. The 1% cap on new surface disturbance within MAs will remain in effect for 5 years, after which the 1% cap will be reviewed by the MOG and amended, if necessary, based on more recent information. Each agency may permit disturbances of up to 1% of the land that the agency manages within the MA. Additions to the 242 Well Field by the BOR and existing, on-going activities at DOD facilities (for MCAS-Yuma, these activities are described in the EIS for the Yuma Training Range Complex) do not count towards this 1%. If disturbance greater than the 1% cap is desired, the agency may request use of the 1% disturbance allowance of other signatory agencies in the MA. All authorizations must be conducted in accordance with applicable mitigation and compensation.

2.2.2 All federally owned lands in the MAs shall be retained in federal ownership (except the patenting of mining claims pursuant to the General Mining Law of 1872). Lands in MAs owned by the state of California and managed as preserves, refuges, or parks shall be retained in state ownership.

2.2.3 Maintenance of all existing ROW facilities may continue within MAs.

2.2.4 The proposed Area Service Highway and its ROW are outside of the Yuma Desert MA. This and other new road construction along the boundary of the Yuma Desert MA shall require fencing to reduce access to the MA and lizard exclusion fencing (Appendix 7) to reduce lizard mortality.

2.3. Limit and/or reduce surface disturbance in MAs from discretionary minerals actions.

2.3.1 Allowable activities are the following: 1) leasing under the mineral leasing laws with no surface occupancy; 2) development and production in existing mineral material extraction sites in accordance with local, state, and federal laws and land-use plans, and subject to applicable mitigation; 3) new leases and permits for geothermal energy with stipulations of no surface occupancy (in California MAs only); and other mining and exploration activities authorized under the General Mining Law of 1872. Replacement wells and operation and maintenance of facilities shall be allowed on existing leases. The activities listed above shall be subject to applicable Mitigation (p. 60) and Compensation (p. 62).

2.4. Limit vehicle access and limit route proliferation within MAs.

2.4.1 Reduce new road construction to a minimum by coordinating access needs and avoiding conflicts and replication in road use, development, and management. Allow maintenance of roads on a case-by-case basis, recognizing that maintenance of some roads may be necessary to prevent proliferation of parallel routes. Any new surface disturbance associated with road maintenance shall require mitigation.

2.4.2 All routes shall be designated either "closed" to motorized vehicles, "open" for general public use by all types of vehicles, or "limited" to a specific season, user, or vehicle type or number. Vehicle use shall be restricted to designated open and limited routes. Routes in MAs shall be given a high priority for signing. Routes shall be considered “closed” unless signed as “opened” or “limited”.

2.4.3 Reduce open and limited route density in MAs, particularly in portions of MAs where route density is high.

2.4.4 Participating land managers shall coordinate with the U.S. BP to ensure cooperation with and enforcement of vehicle regulations in MAs and the RA to the maximum extent possible. Coordination shall include regularly scheduled meetings among signatory agencies and U.S. BP in the Yuma and El Centro Sectors to discuss management issues and ways to resolve those issues.

2.5. Limit the impacts of recreational activities within MAs.

2.5.1 All types of vehicle-oriented recreation in compliance with current regulations may occur within the RA.

2.5.2 Permit no competitive motorized vehicle recreational events within MAs. A competitive event is any event where speed or elements of competition (i.e., winning) are present in any form. Non-competitive events may be allowed on routes designated open for public use during the FTHL season of hibernation. Other types of vehicle-based recreation except camping (see action 2.5.4) in compliance with current regulations may occur within MAs.

2.5.3 Allow currently authorized non-motorized recreational activities, such as rock hounding, hiking, backpacking, non-vehicle based camping, picnicking, bicycling, horseback-riding, hunting, bird watching, and nature study, in all MAs and the RA in accordance with existing regulations. Development of new recreational facilities, such as visitor centers, campgrounds, mountain bike trails, equestrian trails, shall not be allowed within MAs, if these would create new surface disturbance in excess of 1%. Installation of interpretive signing and informational kiosks is allowed.

2.5.4 Allow vehicle-based camping only in developed campgrounds, designated camping areas, or within 50 feet from centerline of a designated open route within MAs. More restrictive measures may apply in certain areas. Non-vehicle camping may occur anywhere.

2.5.5 No long-term camping areas shall be designated or developed in MAs.

2.6. Authorize limited use of plants in MAs.

2.6.1 Make no sales and allow no commercial collecting of native plant products (including whole plants, plant parts, flowers, and seeds) within MAs, except as needed for rehabilitation projects within the MAs.

2.6.2 Authorize no livestock grazing in the MAs.

2.7. Within the MAs, allow off-road military maneuvers and encampments only in designated sites. Allow other military activities on previously disturbed lands managed by DOD agencies consistent with normal operations and functions. Marine Corps activities on the BMGR shall be governed by Conference Opinion 2-21-95-F-114, dated April 17, 1996 (USFWS 1996a), as amended, whether or not the species is listed. This Conference Opinion is consistent with the goal and management objectives set forth in this RMS.

2.8. Suppress fires in MAs and the BLM-administered lands in the RA using a mix of the following methods: 1) aerial attack with fire retardants, 2) crews using hand tools to create fire breaks, and 3) mobile attack engines limited to public roads, designated open routes, and routes authorized for limited-use. Do not allow earth-moving equipment (such as bulldozers) except in critical situations to protect life, property, or resources. Post-suppression mitigation shall include rehabilitation of firebreaks and other ground disturbances using hand tools.

2.9. No pesticide treatments shall be applied within MAs. Use of specifically targeted, hand-applied herbicides (e.g. for tamarisk eradication projects) is allowed.

2.10. Within MAs, other discretionary land uses and activities not consistent or compatible with the above restrictions and the general RMS shall not be approved by the authorizing agency.

3. Within the MAs, rehabilitate damaged and degraded habitat, including closed routes and other small areas of past intense activity. Methods to be used may include, but are not limited to, a) ripping or scarifying compacted soils, b) recontouring the surface, c) pitting or imprinting the surface, d) seeding with native plants, e) planting seedlings, f) irrigating, and g) barricading. See Habitat Rehabilitation on page 69 for additional information.

4. Attempt to acquire through exchange, donation, or purchase from willing sellers all private lands within MAs.

4.1. Establish and maintain with approval of the MOG (see Planning Action 6.1.1) a prioritized list of parcels or screening criteria for acquisition within each MA and habitat corridor.

4.2. Seek funding to acquire key parcels within MAs.

4.3. Using compensation and other funds, acquire land within MAs in accordance with established priorities and/or criteria.

4.4. Participate in exchanges where opportunities arise to acquire key parcels within MAs.

5. Maintain or establish effective habitat corridors between naturally adjacent populations.

5.1. Activities in potential habitat corridors between MAs and the RA shall be regulated or mitigated so that at least occasional interchange of FTHLs occurs among adjacent populations. Potential habitat corridors include lands between West Mesa and Yuha Desert MAs and between West Mesa MA and Ocotillo Wells RA (see Corridors). In addition, activities in the Yuha Desert and Yuma Desert MAs that would prevent interchange of FTHLs across the International Border shall be prohibited.

5.2. Coordinate conservation efforts with Mexico and the Immigration and Naturalization Service to ensure continued movement of FTHLs across the International Border in the Yuha Desert and Yuma Desert MAs.

6. Coordinate activities and funding among the participating agencies and Mexican agencies.

6.1. Maintain information exchange and coordination of monitoring, management activities, and research.

6.1.1 Maintain a FTHL MOG consisting of management representatives from agencies participating in the conservation agreement (see Planning Action 6.2). The FTHL MOG shall provide management-level leadership, coordination, and oversight in the implementation of this RMS. The FTHL MOG shall review progress in implementing the conservation agreement, approve amendments to the RMS, set priorities, and recommend measures to resolve management issues relevant to implementation of the RMS. The FTHL MOG shall provide overall

policy guidance and coordination among the cooperators for the use of compensation funds.

6.1.2 Hold semi-annual meetings of the ICC. Each of the participating agencies shall designate a representative(s) to the ICC. Representatives from other agencies, organizations, and groups with special interests or knowledge of the FTHL may also be invited to ICC meetings. The ICC shall function as a forum for exchange of information on research results and proposals and for discussion of technical and management issues. The ICC may be assigned specific duties and responsibilities by the FTHL MOG.

6.1.3 Develop a forum for discussions with agencies and individual counterparts in Mexico to coordinate activities, provide information exchange, and promote and assist in development of a FTHL conservation program in Mexico.

6.2. Confirm commitment of agencies participating in this RMS through development and signing of a conservation agreement.

6.3. Incorporate management actions from this RMS when developing multi-agency, multi-species ecosystem plans for the ecoregions in the range of the FTHL incorporating management actions from this RMS.

6.3.1 Incorporate actions in the development of the Western Colorado Desert Coordinated Management Plan (including the Yuha Desert, West Mesa, East Mesa, and Borrego Badlands MAs and Ocotillo Wells RA).

6.3.2 Incorporate actions in the development of the CVMSHCP.

6.3.3 Incorporate actions in the development of the Western Colorado Desert Route Designation.

6.4. Coordinate with the BP in developing mutual agreements for the conservation of natural resources.

6.4.1 Encourage use of techniques that minimize BP OHV activity, such as remote cameras and vehicle barriers.

6.4.2 Prepare an educational presentation for briefing BP agents.

7. Promote the purposes of the strategy through law enforcement and public education.

7.1. Provide law enforcement in MAs and the Coachella Valley FTHL conservation areas sufficient to ensure compliance with OHV and other regulations as described in the planned actions.

7.2. Public information and education about the MAs and RA, including but not limited to interpretive signs and brochures, shall be made available to the public at the offices and interpretive centers of the participating agencies. Information provided shall describe the purposes of the MAs, the RA, and conservation areas within the Coachella Valley, and shall list all pertinent regulations.

8. Encourage and support research that will promote the conservation of FTHLs or desert ecosystems and will provide information needed to effectively define and implement necessary management actions. Research should be encouraged both

within and outside of MAs and the RA. Planning actions 8.3 and 8.4 shall be emphasized, as recommended by the ICC.

8.1. All research shall be conducted under permit from the land management agency. Permits from the state game and fish agency may also be required, and from the USFWS if the species is listed.

8.2. The OWSVRA shall continue to budget for research for at least 5 years. A team of scientists and managers will recommend research designs. Results shall be distributed to other land management agencies.

8.3. Continue to refine cost-effective techniques for assessing FTHL abundance.

8.3.1 Test trapping webs and other techniques to enumerate FTHLs directly.

8.3.2 Determine effectiveness of relative enumeration techniques as an index of relative abundance using test plots of known density.

8.4. Determine the following life history and demographic parameters and how they vary with environmental conditions:

- Age-specific mortality
- Longevity
- Clutch size
- Age-specific number of clutches per year
- Hatching success
- Recruitment
- Diet
- Home range size

8.5. Determine effects of the following activities and factors on FTHL demographics and habitat:

- Paved roads and highways
- OHV use and associated activities
- Geothermal development
- Pesticide Use
- Predation
- Non-native plants
- Fire
- Wind turbines

8.6. Determine genetic variation among populations and the effects of barriers on movements.

8.6.1 Determine genetic variation in populations in the different MAs.

8.6.2 Determine effects of human-created barriers such as railroads, canals, paved roads, agricultural fields, and extensively denuded areas.

8.6.3 Determine effects of natural barriers, such as the Colorado River.

8.7. Determine the effectiveness of the proposed mitigation measures.

9. Continue inventory and monitoring.

9.1. Continue to inventory lands within the range of FTHLs to clarify current range and habitat use.

9.2. Monitor habitat quality and population trends in five MAs, and additional MAs as designated, to determine progress toward overall management goal.

9.2.1 The ICC shall monitor implementation of this strategy.

9.2.2 Land management agencies shall monitor regional population trends using standardized techniques (see Appendix 4 and Appendix 5). Each MA shall be monitored using mark-recapture technique to estimate FTHL population size and determine a confidence interval, at least once every three years.

9.2.3 Land management agencies shall document habitat disturbance and loss; recording cumulative totals for percent and acreage of habitat lost. Land management agencies shall document a running total of compensation funds collected to date.

9.2.3.1 Signatory agencies shall conduct aerial reconnaissance and analysis of surface disturbance on the five MAs every five years.

9.2.4 The ICC shall prepare an annual report of monitoring results and progress on implementation of this RMS. The annual report shall be presented to the MOG for review and approval by the end of February each year and shall document implementation of Planning Actions in the previous calendar year. The report shall include a schedule of activities to be accomplished in the current calendar year, budget needs for the next fiscal year, and outyear budget needs for major projects. The report shall also include a summary of monitoring results and a discussion of the likely causes of any noted declines. Recommendations for reversing anthropogenic declines shall be made.

9.2.5 New inventory, monitoring, and research data shall be used in evaluations of the RMS and in assessing proposed changes to the RMS.

Summary of Management Strategy Implementation, 1997-2002

This section summarizes the implementation of Planning Actions identified in the 1997 edition of the RMS. It covers the period from May 1997 through June 2002. Details of items listed in this section can be found in the ICC annual reports that were completed during this period.

1. Delineate and designate flat-tailed horned lizard MAs and a RA.

1.1-1.6. Five MAs and one RA were mapped and precise boundary descriptions completed (see Figure 4 through Figure 9 and Appendix 3). Measures identified in the RMS were implemented within areas mapped as MAs. BLM-El Centro and BLM-Yuma drafted a document to implement the RMS: *The Proposed Amendment to the California Desert Conservation Area Plan and the Yuma District Resource Management Plan to Expand the East Mesa* ACEC, *West Mesa* ACEC, *and Gran Desierto Dunes* ACEC *Boundaries and to Implement the Flat-tailed Horned Lizard*

Rangewide Management Strategy in Imperial County, California and Yuma County, Arizona. A draft EA is attached to the Proposed Amendment (EA No. CA-067-EA-1998-023). Public scoping meetings concerning this proposed amendment were held. Work is in progress to finalize the EA, complete the NEPA process, and legally designate the MAs.

1.7. Encourage development of a MA in the Coachella Valley. The ICC developed a map with recommended boundaries for a MA in the Coachella Valley. The map was submitted to the Science Advisory Committee to be considered for incorporation into the CVMSHCP (see 6.3.2). Areas designated for management of FTHL in the Coachella Valley would take into account habitat connectivity, current levels of degradation, and manageability. Rather than designate a separate FTHL MA in the Coachella Valley, signatories decided to support creation and management of the CVMSHCP **.**

2. Define and implement management actions necessary to minimize loss or degradation of habitat.

2.1. Mitigate and compensate project impacts through humane and cost-effective measures.

2.1.1. Apply mitigation measures. Appropriate mitigation measures were enforced for all authorized projects that impacted FTHLs or their habitat.

2.1.2. Require compensation for residual impacts. Compensation funds were required for most projects that had residual impacts to FTHL habitat. Funds collected totaled $9742 in 1997/98, $5262 in 1998/91, $45,372 in 1999/01, and $246,880 in 2001/02 (the last figure is for BLM-Yuma only). Some projects were not charged compensation. This occurred where mitigation measures eliminated residual effects, and in cases of unauthorized BP project impacts on FTHL.

2.2. Limit authorizations that would cause surface disturbance in MAs.

2.2.1. Attempt to locate projects outside MAs; limit discretionary land use authorizations and ROWs to 10 acres and 1% total per MA. Four projects in excess of 10 acres were authorized; these were 75.7, 31.4, 16.1, and 11.6 acres in size. Acreage and percent of the MA authorized for disturbance were 2.7 and 0.002 % in the Yuma Desert, 20.2 and 0.018 % in the East Mesa, 107.1 and 0.079 % in the West Mesa, 20.2 and 0.036 % in the Yuha Desert, and 0.0 and 0.000 % in the Borrego Badlands.

2.2.2. Federally owned lands in the MAs shall be retained in federal ownership. No disposal of **federal** lands within MAs occurred.

2.2.3. Maintenance in existing ROWs may continue. No action required.

2.2.4. Require fencing along Yuma Desert MA boundary road. Signatory agencies coordinated with Yuma Mesa Irrigation and Drainage District and Yuma County on plans to fence the south side of County 14th Street from Avenue 6E east to Avenue 16E. The fence would be along the northern boundary of the Yuma Desert MA, and is planned to consist of barbed wire and hardware cloth. Fencing will be required along the Area Service Highway.

2.3. Limit surface disturbance in MAs from minerals actions.

2.3.1. Allow approved minerals actions while applying applicable mitigation and compensation. In 1998, 10 acres were adversely affected. In 2001, an additional 8.17 acres were affected by mining in previously existing claims.

2.4. Limit vehicle access and route proliferation in MAs.

2.4.1. Reduce new roads to a minimum in MAs. No new roads were authorized in MAs. However, numerous roads have developed in some MAs through repeated unauthorized use by BP, OHV recreationalists, and/or smugglers.

2.4.2. Designate routes "open", "closed", or "limited". Give route signing a priority. Some closed routes have been signed as such on the boundary of the Yuma Desert MA. The only paved road in the Yuma Desert MA was posted with a 25-mph speed limit to reduce the chance of FTHL mortality. BLM-El Centro signed vehicle routes several times, but overall signing of the route network was incomplete. NAF-El Centro signed routes on their ranges to reduce FTHL mortality. [In January 2003, BLM-El Centro completed route designation for the Western Colorado Desert. All vehicle routes on BLM managed lands in Imperial County were designated as open, closed, or limited. BLM is actively seeking congressional and grant dollars to implement this designation through signing and enforcing open and limited routes and closing and rehabilitating closed routes.]

2.4.3 Reduce route density in MAs. No action. Route densities in some areas increased because of smuggler and BP traffic.

2.4.4. Coordinate with US BP to ensure cooperation and enforcement of vehicle regulations. ICC members held several FTHL orientation sessions with BP agents in the Yuma and El Centro sectors to reduce impacts to FTHL habitat along the International Border. These briefings were designed to familiarize BP agents with FTHL natural history, habitat requirements, and the importance of minimizing vehicular traffic off of designated patrol routes/roads. These briefings were well received by BP personnel. BLM-El Centro implemented an aggressive education strategy with BP to reduce impacts to FTHL habitat. This education included Detailer and Post Academy Orientation in which detailers and new employees assigned to the El Centro sector were given a 1-2 hour presentation on the location of MAs, desert ecology, sensitive species, and how FTHL habitat is affected by off-route travel, including information relating to prey, ecology, and habits of the FTHL. BP representatives attended several MOG meetings, during which the issue of off-road travel was discussed. BLM-El Centro and BP held monthly coordination meetings.

2.5. Limit impacts of recreational activities in MAs.

2.5.1. Allow vehicle-oriented recreation in RA. No action required.

2.5.2. Permit no competitive recreation events in MAs. Competitive races have not been permitted in MAs. Prior to 1997, 6-12 races per year had been held in the West Mesa and Yuha Desert MAs.

2.5.3. Allow non-motorized recreational activities in MAs, but no new recreational facilities. No new recreational facilities were allowed in MAs.

2.5.4. Limit camping in MAs. A camping closure was implemented and enforced as mitigation in the East Mesa MA. This closure was signed and monitored and uses interpretive kiosks to educate the recreational community on FTHL habitat. No camping (or other public access) is allowed in the BMGR portion of the Yuma Desert MA.

2.5.5. No long-term camping areas shall be developed in MAs. None were developed.

2.6. Allow no sales or commercial collecting of plant products in MAs. No plant sales or commercial collecting were allowed.

2.7. Allow military maneuvers and encampments only in designated sites in MAs. Accomplished. A military staging area in the Yuma Desert MA was fenced to identify its location and limits so that adjacent areas would not be impacted.

2.8. Suppress fires in MAs and BLM lands in the RA using allowable methods. No fires occurred.

2.9. No pesticide treatments shall be applied within MAs. No pesticide treatments occurred.

2.10. Within MAs, other activities not consistent with the RMS shall not be approved. None were approved.

3. Rehabilitate damaged and degraded habitat in MAs. BLM-El Centro closed and rehabilitated several unauthorized vehicle tracks. Many of these received further vehicle impacts after being closed.

4. Attempt to acquire all private lands within MAs.

4.1 Maintain prioritized list of parcels for acquisitions. Lists prioritizing parcels for acquisition were maintained by the California OHV Division office headquarters in Sacramento and by BLM-El Centro. BLM-El Centro contacted all landowners within the East Mesa MA to advise them of BLM's desire to acquire their lands through purchase or exchange.

4.2 Seek funding to acquire key parcels in MAs. Compensation funds collected in California were banked for habitat acquisition.

4.3. Using compensation and other funds, acquire key lands in MAs. Acreage of habitat acquired in MAs and the RA is summarized in Table 1. DOD acquired approximately 15,500 acres of Arizona state land within the Yuma Desert MA, with DOD funding. All lands within this MA are now managed by signatory agencies. Private lands totaling 740 acres within and adjacent to the Borrego Badlands MA were acquired. BLM acquired 320 acres in the East Mesa and West Mesa MAs. Acquisitions of private lands totaling 8,936 acres were added to the OWSVRA RA.

4.4. Participate in exchanges to acquire key parcels in MAs. No opportunities for exchange arose.

Table 1. Private and state land acquired in MAs and the RA.

Agency	Acres	Location
Department of Defense	15,500	Yuma Desert Management Area
Ocotillo Wells District	8,936	Ocotillo Wells Research Area
Anza-Borrego State Park	740	Borrego Badlands Management Area
BLM El Centro	240	East Mesa Management Area
BLM El Centro	80	West Mesa Management Area
Total	**25,496**	

5. Maintain or establish effective habitat corridors between naturally adjacent populations.

5.1. Limit or mitigate activities in movement corridors. No projects were considered that would block movement across existing corridors between MAs.

5.2. Coordinate with Mexico and INS to ensure movement across the border. All corridors are currently intact to the best of our knowledge. No projects were considered that would block movement across the International Border.

6. Coordinate activities and funding among the participating agencies and Mexican agencies.

6.1.1. Establish a FTHL MOG. The MOG met three times per year to coordinate implementation of the conservation agreement in response to recommendations from the ICC. Meeting minutes were provided to all MOG and ICC members to facilitate effective coordination.

6.1.2. Hold semi-annual meetings of the ICC. The ICC met quarterly to discuss implementation of Planning Actions under the RMS and issues and challenges regarding implementation of the Planning Actions. In addition to ICC meetings, subgroups of the ICC met on occasion to discuss specific issues.

6.1.3. Develop a forum for discussions with agencies and individuals in Mexico. Directors of the Reserva de la Biósfera Alto Golfo de California y Delta del Río Colorado and the Reserva de la Biósfera el Pinacate y Gran Desierto de Altar cooperated with the ICC in furthering the knowledge and conservation efforts of the FTHL and its habitat. The Alto Golfo director hosted a meeting of the ICC at the Reserve's field station near El Golfo de Santa Clara, Sonora, and participated in one meeting in the U.S. A study, funded by BLM-Yuma and BOR was completed which investigated the status of FTHL in Sonora and Baja California del Norte (Rodríguez 2002), and developed interpretive materials (see 7.2 and 9.1).

6.2 Develop a conservation agreement. The conservation agreement was developed and was signed in June 1997. Signatories were AGFD; California Department of Parks and Recreation; NAF-El Centro; MCAS-Yuma; BLM, California and Arizona state offices; BOR, Lower Colorado Region; and USFWS, Region 1 and Region 2. The CDFG signed in July 1998.

6.3.1. Incorporate actions in Western Colorado Desert ecosystem plan. [BLM-El Centro designated all routes in the Western Colorado Desert as open, closed or limited in January 2003]

6.3.2. Incorporate actions into the CVMSHCP. BLM-Palm Springs participated in the development of the CVMSHCP. [This planning effort was ongoing as of January 2003. In addition, BLM-Palm Springs completed an amendment to the California Desert Conservation Area Plan in December 2002. Actions described in the RMS were incorporated into that planning decision and will be implemented on federal land in the Coachella Valley.]

6.4. Coordinate with U.S. BP to develop mutual agreements. In addition to the education efforts described in 2.4.4, coordination with BP occurred at multiple levels, and BP was represented at several MOG meetings.

7. Promote the purposes of the strategy through law enforcement and public education.

7.1. Provide sufficient law enforcement. AGFD, BLM, and MCAS-Yuma participated in off-road vehicle patrols in the Yuma Desert. Two MCAS-Yuma law enforcement positions were filled in April 2001 for the west side of the BMGR to help prevent illegal off-highway activity. ABDSP law enforcement rangers enforced regulations in the Borrego Badlands MA. Insufficient law enforcement was available to prevent illegal OHV traffic and illegal dumping in the West Mesa, Yuha Desert, East Mesa MAs, and the BOR portion of the Yuma Desert MA. [As of January 2003, BLM-El Centro was filling vacant law enforcement positions and applying for grants to add two additional rangers.]

7.2. Provide public information and education about the MAs and RA. FTHL signs were placed along roads within the East Mesa MA as compensation for a pipeline project. FTHL signs were posted at most access points into the Yuma Desert MA; however, most were subsequently stolen. BOR conducted information workshops and survey training for maintenance staff and other interested parties. Information brochures addressing the FTHL were prepared by staff from OWSVRA, printed in both English and Spanish, and were distributed to other agencies, their staffs, and the public. Funding for these brochures was provided by BOR and BLM. MCAS-Yuma developed a wallet-sized photo information card addressing the FTHL and distributed the card to key personnel working on BMGR. All users of BMGR received a briefing that included information on the FTHL, slides, pictures and/or descriptions. BLM-El Centro completed a range-user brochure and wallet cards to educate all range users of the presence of FTHL and correct procedures to avoid impacting lizards or to report any accidental impacts to lizards. The brochures and wallet cards were distributed to all range users. NAF-El Centro also produced brochures and wallet cards. During the 2001 and 2002 Yuma Birding and Nature Festivals, an ICC member presented one-hour seminars on the biology and conservation of the FTHL and hosted field trips to the Yuma Desert MA. FTHL ecology and habitat, the conservation agreement, and cooperative efforts of the participating agencies were highlighted during the seminars and field trips, all of which were well attended and well received by the public. Rorabaugh *et al.* (2000) presented a paper at a symposium entitled Creative Cooperation in

Resource Management in which they described the multi-agency conservation agreement to implement the RMS for the FTHL. AGFD and USFWS met with the Tucson Herpetological Society and other plaintiffs in a suit against USFWS regarding their 1997 decision to not list the FTHL. This meeting provided an opportunity to better explain the position of AGFD and USFWS regarding the status of the FTHL and the decision to not list it. Preservation of FTHL habitat was a priority issue in discussions with the Yuma Mesa Irrigation and Drainage District, BOR, BLM-Yuma, MCAS-Yuma, and the city of Yuma regarding development in the Foothills and the inclusion of this area into the water district. AGFD coordinated with Yuma city and county planners in the Growing Smarter and open spaces initiatives in Arizona. Discussions included the funding of habitat enhancement/acquisition and the potential for creating FTHL reserves outside the MA. With funding provided by BOR and BLM, Centro Intercultural de Estudios de Desiertos y Océanos worked with the education departments of the Alto Golfo and Pinacate Reserves to develop a brochure that informed visitors about the FTHL, biological features of the Gran Desierto de Altar, and the habitats and potential threats to FTHLs in Mexico (Rodríguez 2002). In addition, the brochure included specific information on regulations and recommendations for people to help protect FTHLs. Signs were developed to place in strategic areas in the reserves and along their borders, particularly areas close to railroad routes, roads frequented by locals, and roads accessing ejido lands.

8. Encourage and support research to promote conservation of FTHL and desert ecosystems.

8.1. Require permits for research. AGFD and CDFG continued to require a scientific collecting permit for any person who handled a FTHL. The AGFD issued 21 permits during this reporting period and CDFG issued seven through June 2001.

8.2. OWSVRA shall continue to budget for research. OWSVRA funded four studies (Young 1999; Setser and Young 2000; Setser 2001; T. Gardner 2002) to collect information on demographics, habitat use, and effects of OHV activity (see 8.4 and 8.5). The Ocotillo Wells District funded genetic and relative abundance studies by Utah State University researchers during the 2002 field season.

8.3. Develop a cost-effective technique for assessing FTHL abundance.

8.3.1. Test trapping and other techniques to enumerate FTHLs directly. ICC members consulted with Dr. David Anderson, a statistician from Colorado State University, regarding the practicality of monitoring FTHL population trends. Colorado State University statisticians developed a proposal for a trapping web design, which uses 97 pit fall traps arranged along 8 lines radiating from a central point. The theory is based on distance sampling, and the statistics of importance are the distances from the center of the web to the traps containing FTHL. Based on capture rates of FTHLs in pit fall traps reported by other studies, the authors recommended establishing 10-15 webs in each MA to achieve desirable sample sizes. ICC members established a trial trapping web in the Yuma Desert MA to test methods and materials, and to help evaluate whether this technique could produce the minimum of five captures per web calculated to be required to estimate

densities and trends. The web was operated in May and September of 2000, 2001, and 2002. Total captures were four, five, five, and four, respectively. A proposal to implement a full-scale trapping web was prepared by the ICC for submittal to funding sources. Young and Young (2000) used intensive tracking techniques to estimate densities in the Yuma Desert MA. Their estimates ranged from 0.5 lizards per hectare during drought conditions to 5.1 lizards per hectare in a good year. They believed that this variability, resulting from variable weather patterns, would be problematic for use in trends analysis. They estimated a minimum population of 28,000 FTHLS on the BMGR in 1996. A proposal to evaluate detection by dogs was drafted and is being finalized. A survey that uses mark/recapture methodology to estimate populations was developed and implemented by BLM-El Centro (Grant *et al.* 2001). It yielded a crude abundance estimate of 1.9 lizards per hectare (95% CI: 1.08 to 3.91 lizards/ha). [In the summer of 2002, the protocol was modified to provide a more robust estimate. This effort resulted in the best MA population estimate to date. The population of FTHLS in the Yuha Basin MA was estimated at 18,494 adults (95% CI = 14,596-22,391) and 8,685 juveniles (95% CI =6,860-10,510). "Adults" included all individuals over 60 mm SVL, while juveniles included all individuals less than 60 mm SVL (Wright and Grant 2002). This method is presented in Appendix 4.]. A presence/absence survey protocol was developed for determining distribution in Mexico (Gardner *et al.* 2001), and a modified version of that protocol is proposed for monitoring distribution in MAS (Appendix 5).

8.3.2. Determine effectiveness of direct enumeration techniques and scat counts as an index of relative abundance. Young and Young (2000) tested pitfall traps, walking surveys, driving surveys, and tracking for their effectiveness in surveying FTHL. Tracking and driving were the most successful.

8.4. Determine life history and demographic data. Young and Young (2000) captured 499 individual FTHLS in Arizona, and fitted 80 with radio transmitters to track movements and habitat use. They made comparisons between FTHLS and desert horned lizards, and between drought years and a wet year. Growth, longevity, predation, home range, habitat use, and behavior were investigated. Setser and Young (2000) caught, measured and marked 95 FTHLS at OWSVRA. They compared growth rates between years and with FTHLS captured in Arizona. They attached transmitters to 58 FTHLS to obtain home range and microhabitat use data. Comparisons were made between males, females, juveniles, and with Arizona FTHLS. They analyzed associations between FTHL habitat use and habitat features. Setser (2001) caught, measured and marked 121 FTHLS at OWSVRA. They compared the length, weight, and condition index between areas and between FTHLS caught in 1999 and 1998. They attached transmitters to 65 FTHLS to obtain home range and microhabitat use data. Comparisons were made between males and females. Gardner *et al.* (2001) x-rayed several gravid FTHLS for reproductive analysis. Gardner and Foley (2001) conducted a research study at NAF-El Centro to quantify availability and use of FTHL habitat at target areas. Weights were tracked through the course of the season and thread bobbins were used to evaluate use of different substrates by FTHLS and desert horned lizards. T. Gardner (2002)

captured a total of 82 individual FTHLs at OWSVRA in 2001 and placed transmitters on 49. Body condition and movements were monitored.

8.5. Determine effects of conflicting activities. A study at the Coachella Valley Preserve compared the invertebrate and reptile communities in an old vineyard and an undisturbed area (Cameron Barrows, CNLM, pers. comm.). Four FTHLs were caught in a regenerating vineyard, indicating their ability to use rehabilitated habitats. Nicolai and Lovich (2000) found that FTHL movements declined after an OHV race in the Yuha Desert. Setser and Young (2000) and Setser (2001) found a negative association between OHV disturbance and FTHL habitat use at OWSVRA. Based on qualitative observations, T. Gardner (2002) did not suggest that any differences in OHV activity had influenced the FTHLs at his study sites at OWSVRA. He did, however, recognize that some habitat factors (vegetation, sand availability) that appeared to differ between the sites may have been influenced by OHV activity. In addition, at OWSVRA, the district ecologist outfitted some individual lizards with radio-telemetry as part of a limited, ongoing study of the effects of OHVs on movement and home ranges. Wright and Grant (2002) determined that neither vehicle track coverage nor number of vehicle routes or roads were significantly correlated with FTHL numbers. However, plots with less than 9% vehicle track coverage had 3.5 times more FTHLs than plots with greater than 9% track coverage. Plots with a route or road on them did not have a significantly different number of FTHLs than plots without a route or road. They suggested that substrate characteristics played a greater role in affecting numbers of FTHLs than did vehicle traffic.

8.6. Determine genetic variation among populations and effects of barriers.

8.6.1. Determine genetic variation in MAs. Tissue samples (toe clips from live animals, plus liver and muscle from sacrificed animals) were obtained from FTHLs in the Yuma Desert MA in Arizona (Gardner *et al.* 2001) and several populations in California, including OWSVRA (Setser 2001; T. Gardner 2002), Yuha Desert (Dan Mulcahy, Utah State University, unpubl. data), East Mesa MA (Dan Mulcahy, unpubl. data; Gardner & Foley 2001), West Mesa MA (Gardner & Foley 2001), and Coachella Valley (Tanya Trepanier, unpubl. data). Tissues from scattered localities in Baja California del Norte and Sonora, Mexico were also obtained (Rodríguez 2002). Dan Mulcahy is conducting the analyses and anticipates completion of the findings in 2003 (pers. comm.)

8.6.2. Determine effects of human-created barriers. This was not investigated.

8.6.3. Determine effects of natural barriers. The genetic analyses described under 8.6.1 will allow an evaluation of the effects of the Colorado River and the Salton Sea Trough as potential natural barriers.

8.7. Determine effectiveness of mitigation measures. BLM-Yuma tested ¼- and ½-inch mesh fencing to determine its durability for potential use in excluding FTHLs from roads. They found that both sizes withstood burial from drifting sand, but the ½-inch mesh resulted in ensnarement and mortality of zebra-tailed lizards. Utah State University researchers installed test enclosures and found that FTHL are not likely to climb fences of either size mesh. Gardner *et al.* (2001) found that ¼-inch

mesh barrier fences were effective in reducing the number of FTHL entering the Auxiliary 2 road in the Yuma Desert MA. These findings were incorporated into a fencing protocol (Appendix 7).

9. Continue Inventory and Monitoring

9.1. Continue inventories. The area between I-10 and Dos Palmas was surveyed to determine if a corridor for FTHL existed there. Only desert horned lizards were found. The substrate was apparently too rocky and coarse for FTHL. Historic FTHL habitat in this area appeared to have been lost to agriculture. BLM-Yuma and AGFD completed a project to test Landsat imagery to predict FTHL occurrence. They found that the imagery could be used to predict with moderate accuracy areas of high to moderate lizard density. Areas with few or no FTHL could not be predicted with any accuracy, however. BLM-Palm Springs surveyed the area between the east end of Indio Hills and the Coachella Valley Preserve for FTHL and found none. These two populations were probably genetically isolated from one another. Due to the small area the Indio Hills population occupies (1,800 acres), its heavily impacted nature, and low population density, it is not believed to be viable in the long term. Surveys were conducted along fringe areas of the Borrego Badlands MA in the area of Clark Dry Lake, Font's Wash, and the western Borrego Badlands. These surveys added to our knowledge of documented FTHL range. FTHL were monitored for presence/absence on a provisional basis (pending the establishment of an effective protocol) at OWSVRA. With funding from BOR and BLM, an important study to investigate the distribution of FTHL in Sonora and Baja California del Norte was conducted. The Centro Intercultural de Estudios de Desiertos y Océanos, a binational non-governmental organization in Puerto Peñasco, Sonora, was contracted to conduct this study. The principal investigator worked closely with ICC members to develop a survey protocol, conduct surveys, and analyze the results. Cooperators in this project included the Reserva de la Biósfera Alto Golfo de California y Delta del Río Colorado, the Reserva de la Biósfera el Pinacate y Gran Desierto de Altar, and several ICC agencies. ICC members made several trips, totaling 43 person-days of effort, to assist with this project. New distributional records were obtained in Baja California, the Gran Desierto, and Alto Golfo. A database was developed in conjunction with these surveys for storing locality records of FTHL in Mexico, morphometric and habitat data, and time and date of encounters. An interim report was completed during this reporting period, and a final report was completed in July 2002 (Rodríguez 2002).

9.2. Monitor habitat quality and population trends in the MAs.

9.2.1. Monitor implementation of the RMs. Implementation has been monitored through the compilation of annual reports as required by 9.2.4 (ICC 1998; Henry 1999; Twedt and Wright 2002).

9.2.2. Monitor population trends. Trends in encounter rates for FTHL and their scat were analyzed using data collected from 1979 to 2001 on three MAs in California (Wright 2002). Each year from 1979 to 2001 (except 1981), sample sites were drawn at random or systematically from three areas in the eastern Yuha Desert,

West Mesa, and southern East Mesa MAs. Analysis of these data showed no significant trends in encounter rates of FTHL or their scat. However, given the potential observer and sampling biases, a minor trend (upward or downward) could not be ruled out. Extension of this work into 2002 in the eastern Yuha Desert showed a similar non-significant trend (Wright and Grant 2002). Observations of FTHL during the course of biannual reptile surveys at OWSVRA were recorded as part of regular monitoring. FTHL observations by staff during archeology surveys, ranger patrol, or in the course of maintenance duties were noted. MCAS-Yuma continued its long-term surveys of the Auxiliary 2 road to assess the number of road kills and to monitor population trends.

9.2.3. Document habitat disturbance and loss. Data forms were developed to facilitate standardized assessment and documentation of habitat disturbance and loss. The habitat impacts that were authorized are shown in Table 2. Narratives describing these impacts and significant impacts on state or private lands may be found within the ICC annual reports. The Navy contracted Tierra Data Systems to aerial photograph and digitally map the 5 MAs and the RA to document habitat loss and disturbance. This effort provided a baseline with which to compare future analyses of habitat condition. BLM-El Centro began to quantify the level of vehicular impacts to FTHL habitat in their resource area using a step-point method. This consisted of walking 2.5-mile triangular transects within randomly chosen sections and tabulating what was found at the point of the surveyor's toe every 20th step along the transect. Variables measured included plants, vehicular tracks, organic litter, human footprints, water bottles, piles of clothes, and campfires. These surveys were conducted in 2001 in southeastern and southern portions of the Yuha and East Mesa MAs, respectively. Approximately 10.5% of the southeastern portion of the Yuha Desert MA was found to be covered with vehicle tracks. About 4.8% of the southern half of the East Mesa MA was covered with vehicle tracks (Wright 2002). The number of vehicle routes crossed by 12 transects in the Yuha Desert MA declined by 45% from 2001 to 2002, probably due to unusually strong spring sandstorms and changes in BP practices (Wright and Grant 2002). A similar effort was conducted in the Yuma Desert MA, where vehicle tracks were found to cover 2.9% of the ground surface in the BMGR portion of the MA and 3.4% of the surface in the 5-Mile Zone portion (Rorabaugh *et al.* 2002).

9.2.4. **Prepare an annual report of monitoring results and implementation progress.** Two annual reports (ICC 1998; Henry 1999) and a biannual report (Twedt and Wright 2002) were produced that summarized monitoring and RMS implementation from July 1997 through June 2001. The 2001/2002 report was in preparation.

9.2.5. New data shall be used in evaluations of the RMS and in assessing proposed changes. The new information described in the planning actions above was relied upon heavily during the revision of this RMS.

Table 2. Acres of FTHL habitat authorized for impact on lands managed by signatory agencies.

Agency	Inside MA	Outside MA	Total[1]
Palm Springs BLM	0	40.6	40.6[2]
El Centro BLM	146.5	240.8	387.3
Yuma BLM	0	81.3	81.3
Naval Air Facility - El Centro	1	0	1
Marine Corps Air Station-Yuma	2.5	0	2.5
Anza-Borrego Desert State Park	0	0	0
Ocotillo Wells SVRA	0	0	0
Bureau of Reclamation	0.2	391	391.2
Total Acres	150.3	753.7	904.0

[1]Figures exclude impacts from casual OHV use, BP activity, and OHV racing.

[2]Disturbance was considered temporary on 38.6 acres and permanent on 2 acres.

Management Implementation Schedule, 2003-2007

Table Description

The following table displays the priority, responsible agency, estimated cost, and schedule for completing each Planning Action. Initiation of these actions is subject to availability of funds. Actions in the table are explained further in the corresponding Planning Actions.

The priorities indicated in the table are assigned the following definitions:

Priority 1: An action that must be taken in the near term to conserve the species and prevent irreversible population declines.

Priority 2: An action that must be taken to prevent significant declines in population or habitat quality.

Priority 3: All other actions necessary to meet the goals and objectives of this Strategy.

The following abbreviations and symbols are used in the implementation schedule:

ABDSP.....Anza-Borrego Desert State Park

AGFD .....Arizona Game and Fish Department

BLM .....Bureau of Land Management

BOR.....Bureau of Reclamation

ICC.....Interagency Coordinating Committee

CDFG.....California Department of Fish and Game

OWSVRA.....Ocotillo Wells State Vehicular Recreation Area

USFWS.....U.S. Fish and Wildlife Service

USMC.....U.S. Marine Corps

USN .....U.S. Navy

☑.....Task completed since 1997

☐.....Task not completed

⇨,↻.....Task ongoing

Management Strategy Implementation Schedule, 2003-2007

Status	Priority	Action number	Planned action	Duration (yrs)	Resp agency	Total cost ($000)	Cost estimates ($000) FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
		1.	**Delineate and designate FTHL MAs**								
☑	1	1.1	Designate Yuma Desert MA	2	BLM BOR USMC	0					
☑	1	1.2	Designate East Mesa MA	2	BLM USN	0					
☑	1	1.3	Designate West Mesa MA	2	BLM USN	0					
☑	1	1.4	Designate Yuha Desert MA	2	BLM	0					
☑	1	1.5	Designate Borrego Badlands MA	2	ABDSP	0					
☑	3	1.6	Designate Ocotillo Wells RA	1	BLM OWSVRA ABDSP	0					
☑	1	1.7	Designate conservation areas in Coachella Valley	2	BLM USFWS CDFG	0					
		2.	**Define and implement actions necessary to minimize loss or degradation of habitat**								
⇨	1	2.1.1	Apply mitigation measures	↻	ALL	0					
⇨	1	2.1.2	Require compensation	↻	ALL	25	5	5	5	5	5
⇨	1	2.2.1	Limit discretionary land uses authorizations and rows to 10 acres and 1% total per MA	↻	ALL	0					
⇨	1	2.2.2	Do not dispose of lands in MAs	↻	ALL	0					
⇨	3	2.2.3	Continue maintenance in existing ROWs	↻	ALL	0					
⇨	2	2.2.4	Require fencing along Yuma Desert MA boundary road	↻	ALL	0					
⇨	2	2.3.1	Limit surface disturbance from mineral activities in MAs	↻	ALL	0					
☑	2	2.4.1	Reduce new roads to a minimum in MA s	2	ALL	0					
☐	1	2.4.2	Designate routes "open," "closed, or limited." Give route signing a priority	2	BLM	200	50	90	20	20	20
☐	1	2.4.3	Reduce route density in MAs		See 2.4.2						
⇨	1	2.4.4	Coordinate with U.S. BP	↻	ALL	20	4	4	4	4	4
⇨	3	2.5.1	Allow OHV recreation in RA	↻	OWSVRA	0					
⇨	1	2.5.2	No competitive recreational events in MAs	↻	ALL	0					
⇨	2	2.5.3	Allow non-motorized recreational activities in MAs, but no new recreational facilities	↻	ALL	0					
⇨	2	2.5.4	Limit camping in MAs	↻	BLM	20	10	10			

Management Strategy Implementation Schedule, 2003-2007

Status	Priority	Action number	Planned action	Duration (yrs)	Resp agency	Total cost ($000)	Cost estimates ($000) FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
⇨	2	2.5.5	No new long-term visitor areas in MAs	↻	ALL	0					
⇨	3	2.6	Authorize limited use of flora in MAs	↻	ALL	0					
⇨	1	2.7	Allow military maneuvers and encampments only in designated sites in MAS	↻	USN USMC	0					
⇨	3	2.8	Suppress fires in MAS using limited fire suppression methods in MAs	↻	ALL	0					
⇨	1	2.9	Prohibit pesticide treatments in MAs	↻	ALL	0					
⇨	3	2.10	Limit other activities consistent with above	↻	ALL	0					
		3.	**Rehabilitate damaged and degraded habitat**								
⇨	2	3	Rehabilitate damaged and degraded habitat in MAs	↻	BLM BOR ABDSP USMC USN	200	40	40	40	40	40
		4.	**Bring all lands within MAs into public management**								
☑	3	4.1	Maintain prioritized list of parcels for acquisitions; and respect private rights	1	ALL	0					
☐	3	4.2	Procure funds for land acquisitions in MA s (37,600 acres of private lands acres in California MAs at $250 per acre)	↻	BLM CDFG ABDSP OWSVR A	9,400					
⇨	3	4.3	Use compensation funds to acquire key lands in MAs	↻	BLM CDFG ABDSP OWSVR A	20	4	4	4	4	4
⇨	3	4.4	Exchange lands opportunistically	↻	BLM	20	4	4	4	4	4
		5.	**Maintain or establish effective habitat corridors between naturally adjacent populations**								
⇨	2	5.1	Limit or mitigate activities in movement corridors	↻	ALL	25	5	5	5	5	5
⇨	3	5.2	Coordinate with Mexico and INS	↻	ALL	10	2	2	2	2	2
		6.	**Coordinate activities and funding among the participating agencies and Mexican agencies**								
☑	2	6.1.1	Establish FTHL MOG	↻	ALL	5	1	1	1	1	1
⇨	2	6.1.2	Hold semi-annual ICC meetings	↻	ALL	5	1	1	1	1	1
⇨	3	6.1.3	Establish forum for discussions with agencies and individuals in Mexico	↻	ALL	5	1	1	1	1	1

Management Strategy Implementation Schedule, 2003-2007

Status	Priority	Action number	Planned action	Duration (yrs)	Resp agency	Total cost ($000)	Cost estimates ($000) FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
☑	1	6.2	Develop Conservation Agreement	1	ALL	0					
☐	2	6.3.1	Incorporate actions in Western Colorado Desert ecosystem plan (Note: other state and local agencies will fill key roles)	3	ALL	750	20	300	250	200	
☑	2	6.3.2	Incorporate actions in CVMSHCP (Note: other state and local agencies will fill key roles)	3	BLM CDFG USFWS	600	300	200	100		
☐	2	6.3.3	Incorporate actions in Western Colorado Desert Route Designation	3	BLM						
⇨	1	6.4	Coordinate with U.S. BP and develop mutual agreements	2	BLM BOR	6	3	3			
⇨	2	6.4.1	Encourage use of techniques to minimize BP OHV activity	↻	BLM BOR	5	1	1	1	1	1
☐	2	6.4.2	Prepare educational briefing for BP agents	1	BLM BOR	5					
		7.	**Promote the purposes of the strategy through law enforcement and public education**								
⇨	1	7.1	Provide adequate law enforcement	↻	BLM CDFG AGFD	750	150	150	150	150	150
⇨	3	7.2	Provide public information and education	↻	ALL	25	5	5	5	5	5
		8.	**Conduct research necessary to effectively define and implement necessary management actions**								
⇨	3	8.1	Require permits for research	↻	ALL	5	1	1	1	1	1
⇨	2	8.2	OWSVRA shall continue to fund research	↻	OWSVRA	200	40	40	40	40	40
☐	2	8.3.1	Test trapping as a population census technique	2	ALL	170					
☐	2	8.3.2	Test direct counting methods	2	ALL		Included in 8.2 and 8.3.1				
☐	2	8.4	Determine life history and demographic data	2	ALL		Also included in 8.2 and 8.3.1				
☐	2	8.5	Determine effects of conflicting activities	5	ALL	300					
☐	3	8.6.1	Determine genetic variation in population	5	ALL	30					
☐	3	8.6.2	Determine effects of non-natural barriers	5	ALL	30					
☐	3	8.6.3	Determine effects of natural barriers	5	ALL	15					
☐	3	8.7	Determine effectiveness of mitigation measures	5	ALL	20					
		9.	**Continue inventory and monitoring**								

Management Strategy Implementation Schedule, 2003-2007											
Status	Priority	Action number	Planned action	Duration (yrs)	Resp agency	Total cost ($000)	Cost estimates ($000) FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
⇨	2	9.1	Continue inventories	↻	ALL	125	25	25	25	25	25
⇨	2	9.2.1	Monitor implementation	↻	ICC	40	8	8	8	8	8
⇨	2	9.2.2	Monitor population trends	↻	ALL (MCAS)	320 (70)	70	105 (35)	70	105 (70)	70
⇨	1	9.2.3	Document habitat disturbance and loss	↻	ALL	40	8	8	8	8	8
⇨	1	9.2.3.1	Conduct aerial reconnaissance and analysis of surface disturbance on the five MAs every five years	↻	ALL	50					
⇨	2	9.2.4	Prepare annual monitoring/implementation report	↻	ICC	20	4	4	4	4	4
⇨	1	9.2.5	Use new inventory, monitoring, and research data in evaluations and proposed changes	↻	ALL	0					

Habitat Management

Management Areas

Each MA is controlled by multiple agencies and may include private inholdings (Table 3). MAs were designed to include most FTHL habitat identified as key areas in previous studies, even though the absolute densities of FTHLs within the MAs were not known. MAs were proposed based upon accepted principles of good preserve design, utilizing the best information available at the time. MAs included as large an area as possible, but avoided extensive, existing and predicted management conflicts (e.g., OHV open areas). Conflicts that are localized in nature (e.g., sand and gravel mines, military bombing targets) were accepted within some of the MAs. The MAs are the core areas for maintaining self-sustaining populations of FTHLs in perpetuity. Legal descriptions of the MAs and the RA are provided in Appendix 3, and maps (Figure 4 to Figure 10) are provided below. Maps do not show existing OHV trails, which are extensive in some MAs, except for major trails at OWSVRA.

The prescriptions that guide the management of lands within the MAs (see Planning Action 2, pg 27) were designed primarily to reduce surface disturbance and to promote reclamation of areas, such as duplicate roads that are no longer needed.

Table 3. Overview of Acreage and Ownership of Management Areas.

Management Area[1]	Federal Non-military[2]	Federal Military	State[3]	Private	Total
Yuma Desert[4] (Figure 4)	16,200	114,800[5]	0	0	131,000
East Mesa (Figure 5)	99,900	8,500	0	6,900	115,300

West Mesa (Figure 6)	83,200	29,800	1,300	21,800	136,100
Yuha Basin (Figure 7)	57,200	0	0	3,000	60,200
Borrego Badlands (Figure 8)	0	0	36,500	5,900	42,400
Total	256,500	153,100	37,800	37,600	**485,000**

1 The existing Coachella Valley Preserve and Dos Palmas ACEC (not included in table) includes about 17,076 and 14,400 acres, respectively, administered by federal and state agencies and private organizations.

2 Includes lands administered by the BLM and BOR.

3 Includes lands administered by California Department of Parks and Recreation and California State Lands Commission

4 Pending designation of the proposed Area Service Highway. A portion of the Yuma Desert MA boundary will be formed by the Area Service Highway, if and when constructed (see Figure 4).

5 Lands administered by MCAS-Yuma

Other Lands

Ocotillo Wells State Vehicular Recreation Area

A RA was established in California (Figure 9) where FTHL research is encouraged and funded by the California Department of Parks and Recreation's Division of Off-Highway Motor Vehicle Recreation (Foreman 1997). The RA is about 77,000 acres in size. About 47,000 acres of the RA are owned by the state and 22,000 acres are owned by BLM, all of which are managed as OWSVRA. The State has applied to BLM under the Recreation and Public Purposes Act for transfer and patenting of all 22,000 acres of BLM land to OWSVRA. The State is also actively acquiring the remaining private lands (8,000 acres) within the RA.

OWSVRA is mandated to provide OHV recreation (free-play, racing, and touring) in a manner to sustain long-term use. Soil removal, artifact collecting, hunting, and shooting are prohibited within OWSVRA. No collecting of reptiles is allowed except under a scientific collecting permit issued by CDFG and approved by OWSVRA.

In 1991, an extensive wildlife survey and habitat protection plan (Kutilek *et al*. 1991; Wone *et al.* 1991) was completed in OWSVRA. The presence of FTHLs and the possibility of listing precipitated a study in 1994 (Wone *et al*. 1994) to develop methods for monitoring population trends in OWSVRA. In these studies, methods of monitoring FTHL population trends on permanent plots in OWSVRA and on control plots were assessed (Wone and Beauchamp 1995b; Wone *et al.* 1997). OWSVRA has since funded several studies (Young 1999; Setser and Young 2000; Setser 2001; T. Gardner 2002; Gardner in prep) investigating topics such as: demographics, habitat use (including investigation of the mud hills habitat type), movement patterns, and the effects of OHV activity on FTHLs and their habitat. OWSVRA has made a commitment to continue to support FTHL research through 2007.

Anza-Borrego Desert State Park

Lands within ABDSP are managed to conserve native plant and animal communities. Mining, soil removal, grazing, rock hounding, artifact collection, hunting, shooting, and other activities that could cause surface disturbances are prohibited in the park. FTHLs occur on an estimated 30,000 to 40,000 acres of the Park.

Within the 600,000-acre park, there is a system of primitive roadways about 500 miles in length. No vehicular activity is allowed off these roadways. Patrol rangers cite violators; the park's patrol aircraft provides backup. Designated roads that might impact sensitive natural or cultural

resources can be closed seasonally or permanently by order of the District Superintendent. OHVs are prohibited from park roads unless they are licensed for use on highways. This rule essentially excludes use of all-terrain vehicles, quad-runners, high performance two-cycle motorcycles, and most dune buggies.

All animal and plant life within ABDSP is protected. No collection of reptiles is allowed, with the exception of those taken under a scientific collecting permit issued by the park office. Reptile poaching takes place on paved roadways, but usually does not include FTHLs (ABDSP files; Mark Jorgensen, pers. comm.)

Coachella Valley

Upon completion, the CVMSHCP will protect approximately 44.5% of the remaining FTHL habitat in the valley. This plan has been in preparation approximately 7-8 years, and will likely be signed in 2003. The FTHL is a covered species in this plan. An earlier HCP, implemented in 1986 to provide protection for the Coachella Valley fringe-toed lizard, also provides protection for FTHL habitat in the valley. Several hundred acres of privately owned and currently occupied habitat remains adjacent and connected to protected habitat. These lands are currently at risk for development, but will be protected if there are willing sellers and funds available to purchase through the CVMSHCP (Barrows 2002). In addition to protections via the CVMSHCP, habitat for FTHL within Dos Palmas ACEC and other BLM-managed public lands in eastern Riverside County, are already in conservation status and will remain so.

In the mid 1980's, the Coachella Valley Preserve System was established primarily for conservation of the Coachella Valley fringe-toed lizard (*Uma inornata*). The BLM, USFWS, CDFG, California Department of Parks and Recreation, and The Nature Conservancy acquired major portions of the preserve system. The System consists of three units totaling about 20,114 acres (Coachella Valley Preserve - 17,076 acres; Willow Hole-Edom Hill Preserve - 1,863; and Indian Avenue Preserve - 1,175 acres). About 6,000 acres of the System contain suitable FTHL habitat (Figure 10). The USFWS holdings were designated the Coachella Valley National Wildlife Refuge System. BLM-administered lands were designated an ACEC in 1993. The CDFG lands were designated an Ecological Reserve. The CDPR manages the adjacent Indio Hills State Park in a manner consistent with the Preserve goals. An interim plan was prepared in 1986 by The Nature Conservancy; it was replaced by an updated, interagency management plan in 1995 (BLM *et al*. 1995). A preserve management team meets quarterly to discuss management activities. No vehicular traffic is allowed.

Dos Palmas ACEC

The Dos Palmas ACEC is located north of the Salton Sea community of North Shore and encompasses about 14,400 acres of federal, state, and private lands. Surveys for FTHL in the southern part of the ACEC in the late 1970's resulted in the discovery of FTHL near Bat Cave Buttes. No additional surveys have been conducted since the 1970's. The ACEC is managed cooperatively by an interagency management committee, consisting of representatives from BLM, CDFG, California Department of Parks and Recreation, CNLM, and USFWS, which meets quarterly to discuss management issues and directions. In 1998, BLM prepared an Ecosystem Management Plan for the ACEC and continues to implement that today. Vehicular traffic is limited to existing, designated routes. BLM-Palm Springs has requested funding in Fiscal Years 2004 and 2005 to conduct surveys at Dos Palmas and east toward the East Mesa MA in Imperial County.

Arizona Lands outside the Yuma Desert MA

On BLM and BOR FTHL habitat outside BMGR, OHV use is limited to existing roads and trails. Because BLM and BOR are signatories to this document, surface-disturbing projects are subject to mitigation and compensation as described in this document. The Arizona State Land Department has not developed a plan for the management of state of Arizona lands within FTHL habitat. The State Land Department is processing land purchase applications for state of Arizona lands east of Yuma and near San Luis.

Mexican Habitat

Although this strategy currently addresses habitat in the U.S. only, there are objectives and planned actions for establishing and maintaining contacts with appropriate agencies and personnel in Mexico to promote the conservation of FTHL habitat within Mexico. Agencies that have the authority to work with Mexico, including the AGFD, CDFG, USFWS, BOR, and BLM, have developed partnerships with agencies, researchers, and non-governmental organizations in Sonora, and will work to develop similar contacts in Baja California Norte. It is hoped that through these contacts and exchanges of ideas a similar management strategy will be adopted in Mexico. This program may include corridors between MAs in the U.S. and Mexico.

Lands in El Parque Nacional del Pinacate Cerro Pinto and the Sierra del Rosario in Sonora and near the delta of the Colorado River in Sonora and Baja California are in core protection zones of biosphere reserves (Reserva de la Biósfera de El Pinacate y Gran Desierto de Altar and Reserva de la Biósfera del Alto Golfo de California y Delta del Río Colorado). El Parque Nacional del Pinacate is an area administered by the Mexican government with use restrictions similar to a national park in the U.S. However, the boundaries are not well established, and enforcement of regulations is minimal. The Pinacate area is primarily a volcanic zone within which FTHL habitat is probably limited to the sandy perimeters of Volcán Pinacate. Reserva de la Biósfera Alto Golfo includes FTHL habitat in Sonora in the vicinity of the Colorado River Delta and the Gran Desierto.

Figure 4. Yuma Desert Management Area.

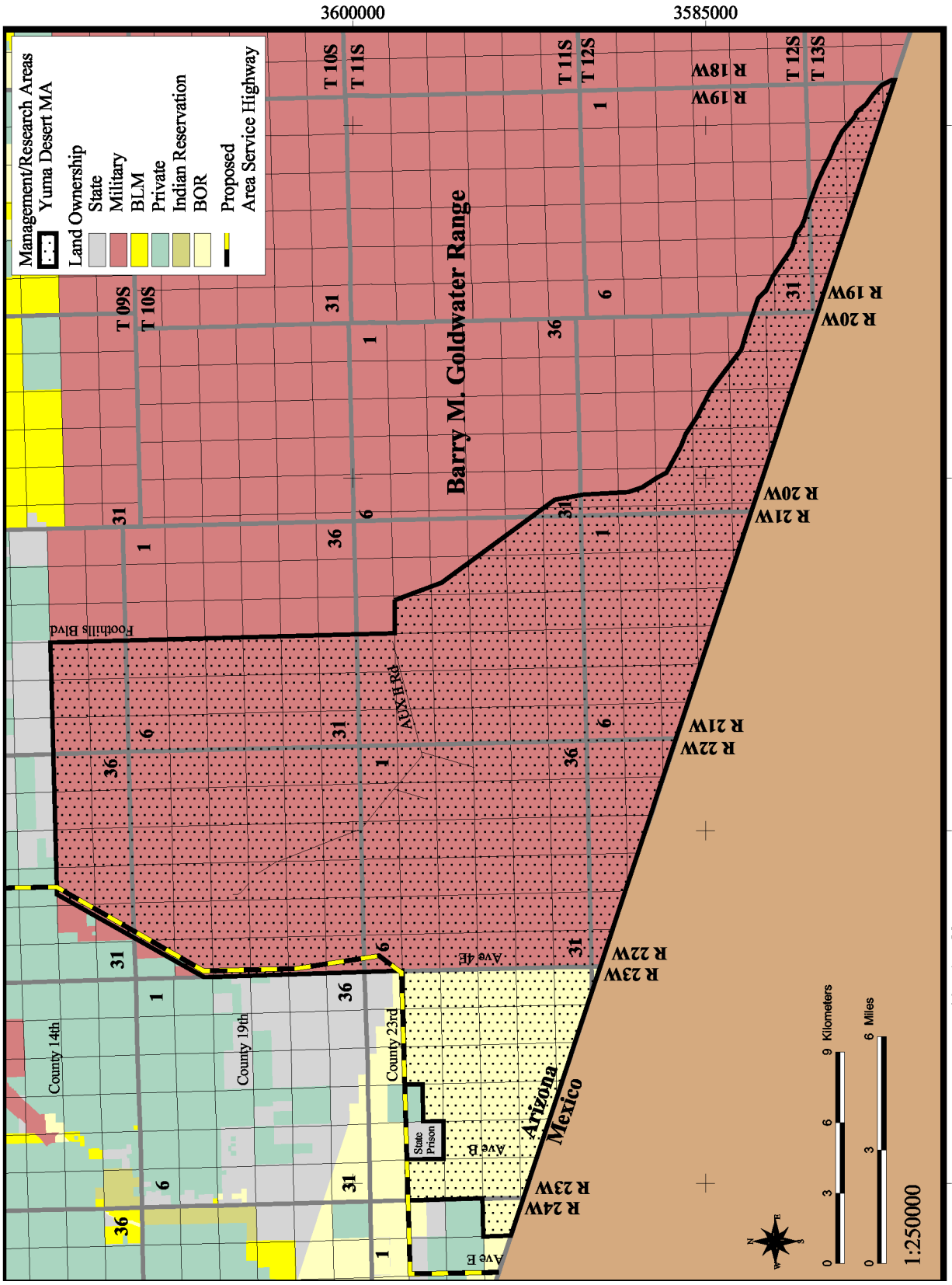


Figure 5. East Mesa Management Area.

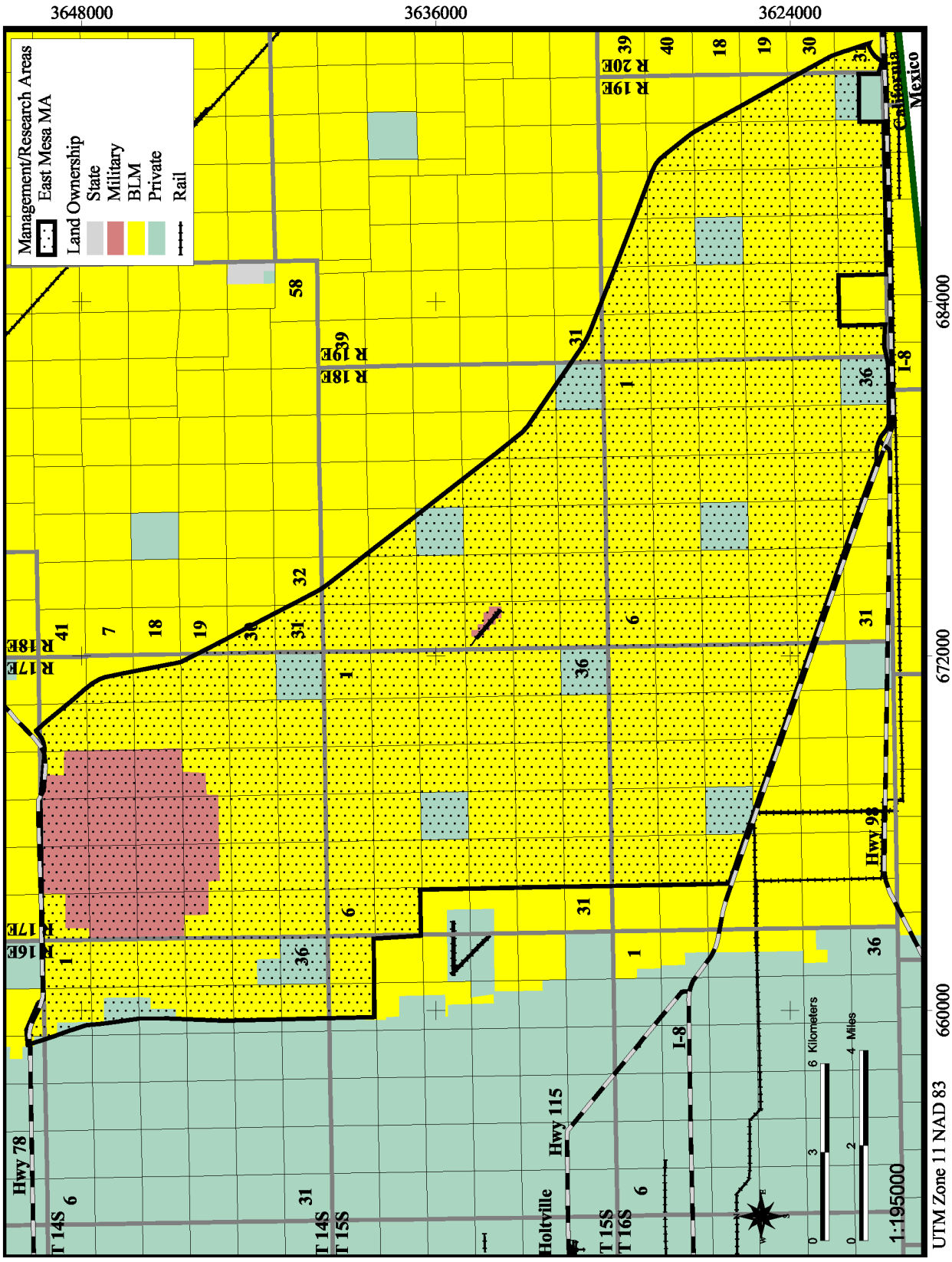


Figure 6. West Mesa Management Area.

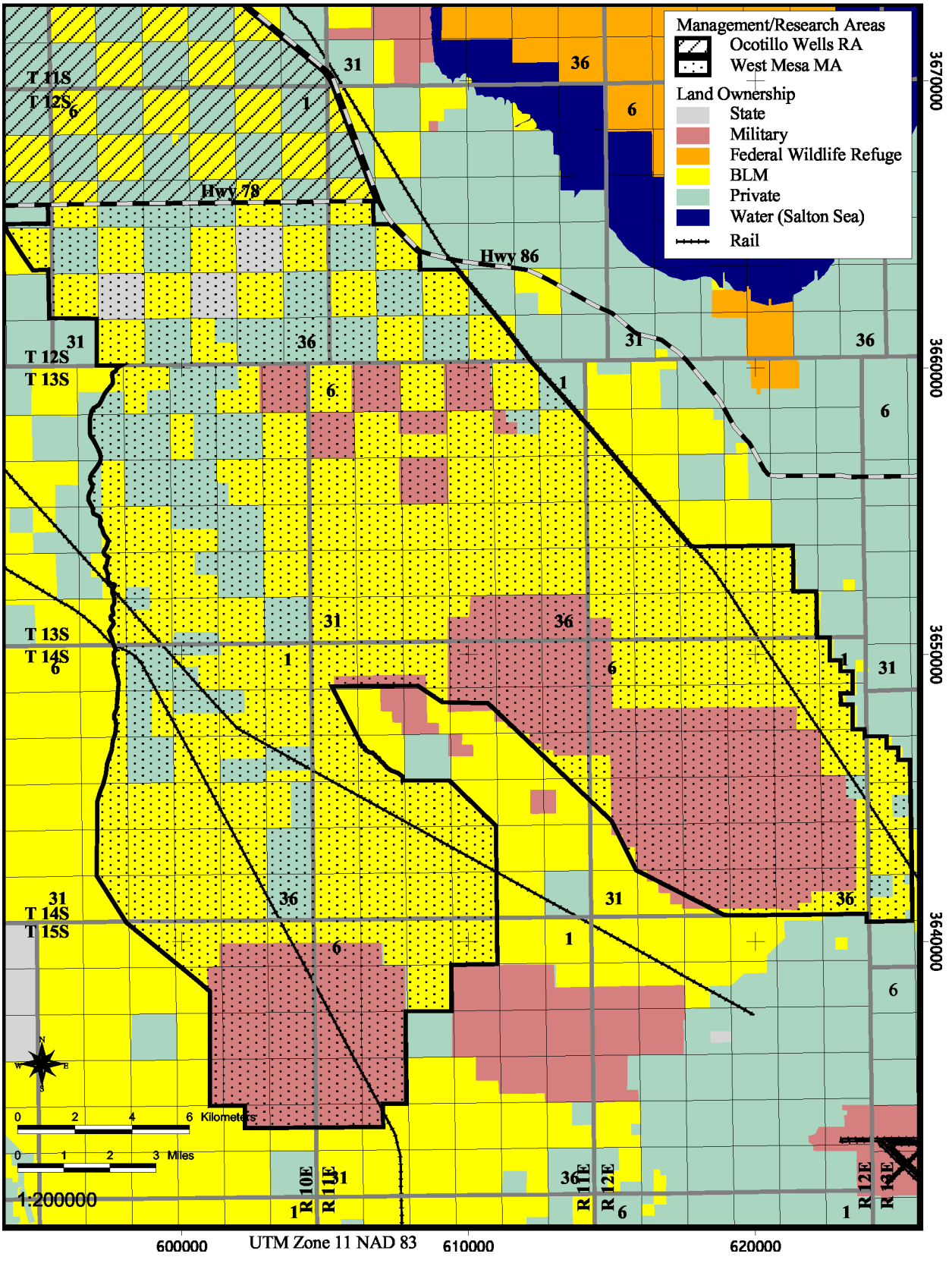


Figure 7. Yuha Desert Management Area.

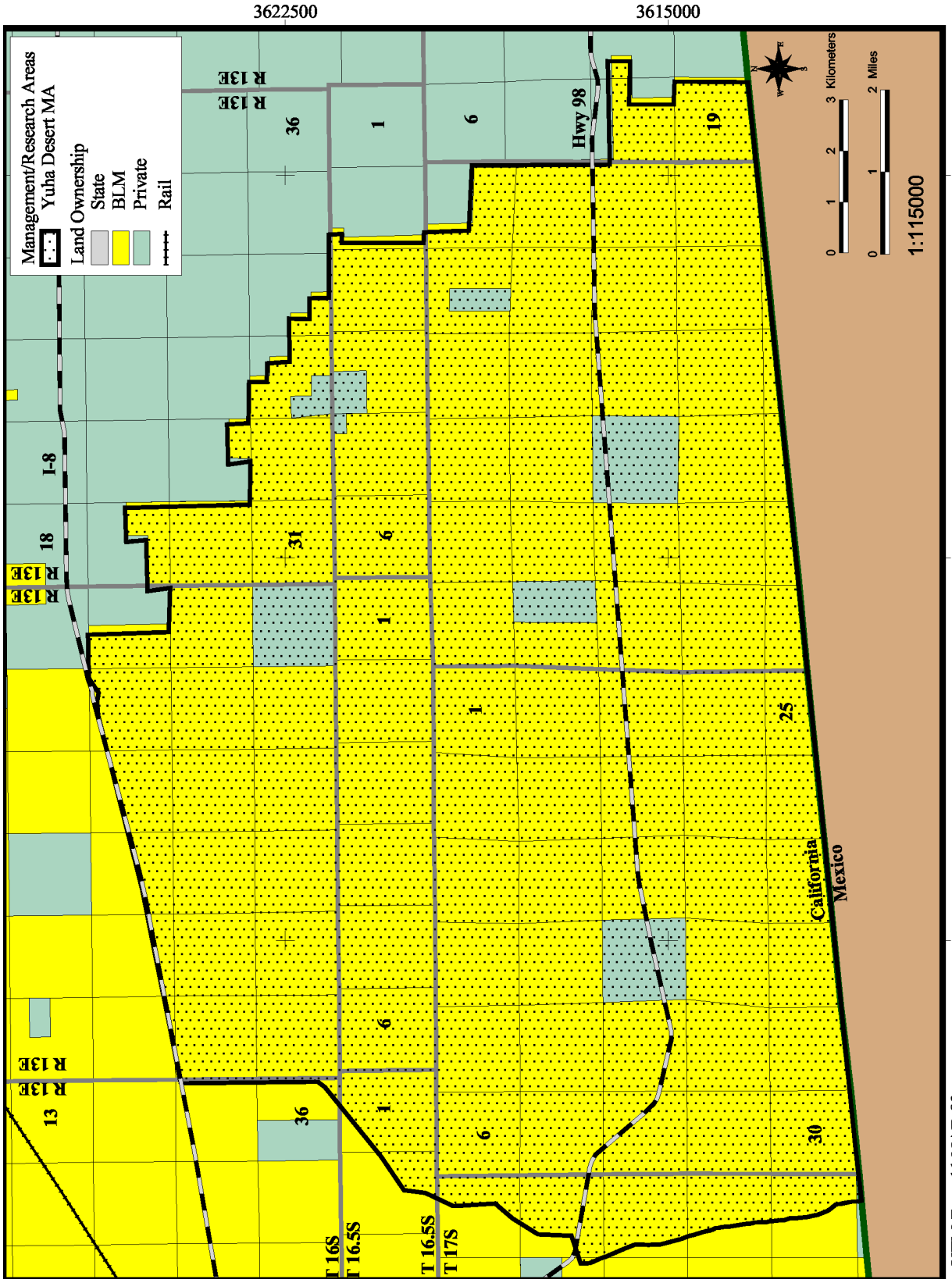


Figure 8. Borrego Badlands Management Area.

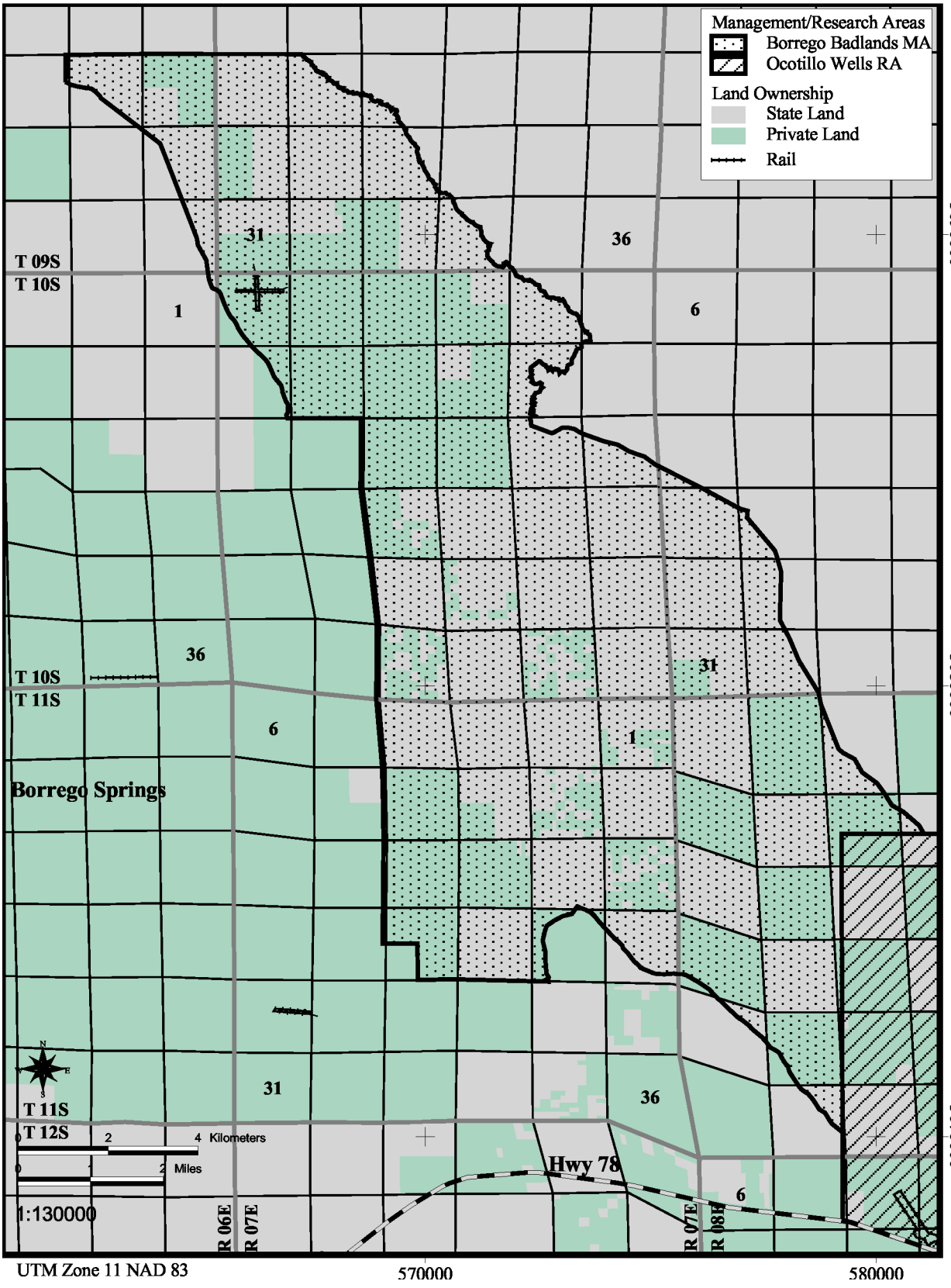


Figure 9. Ocotillo Wells State Vehicular Recreation Area Research Area.

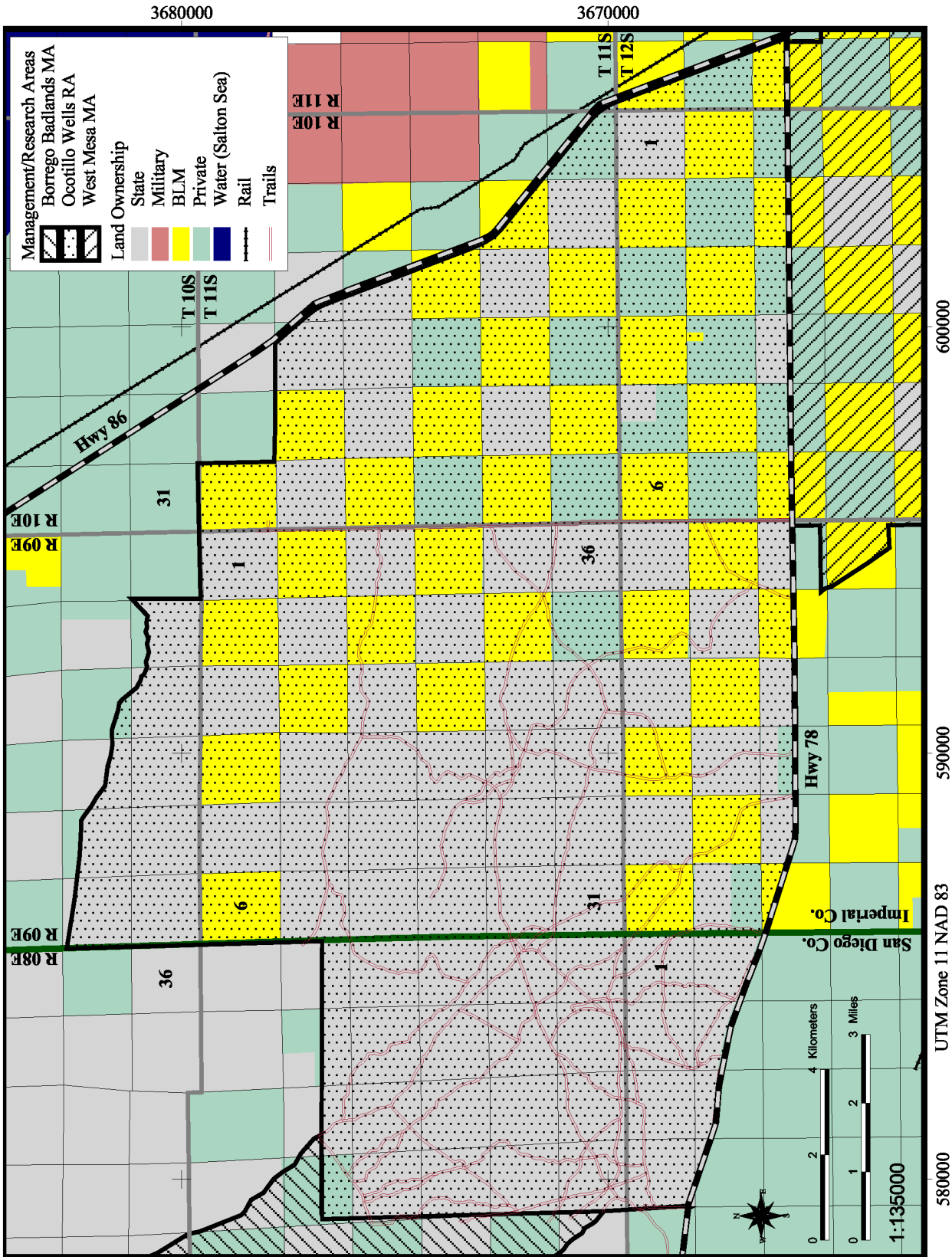
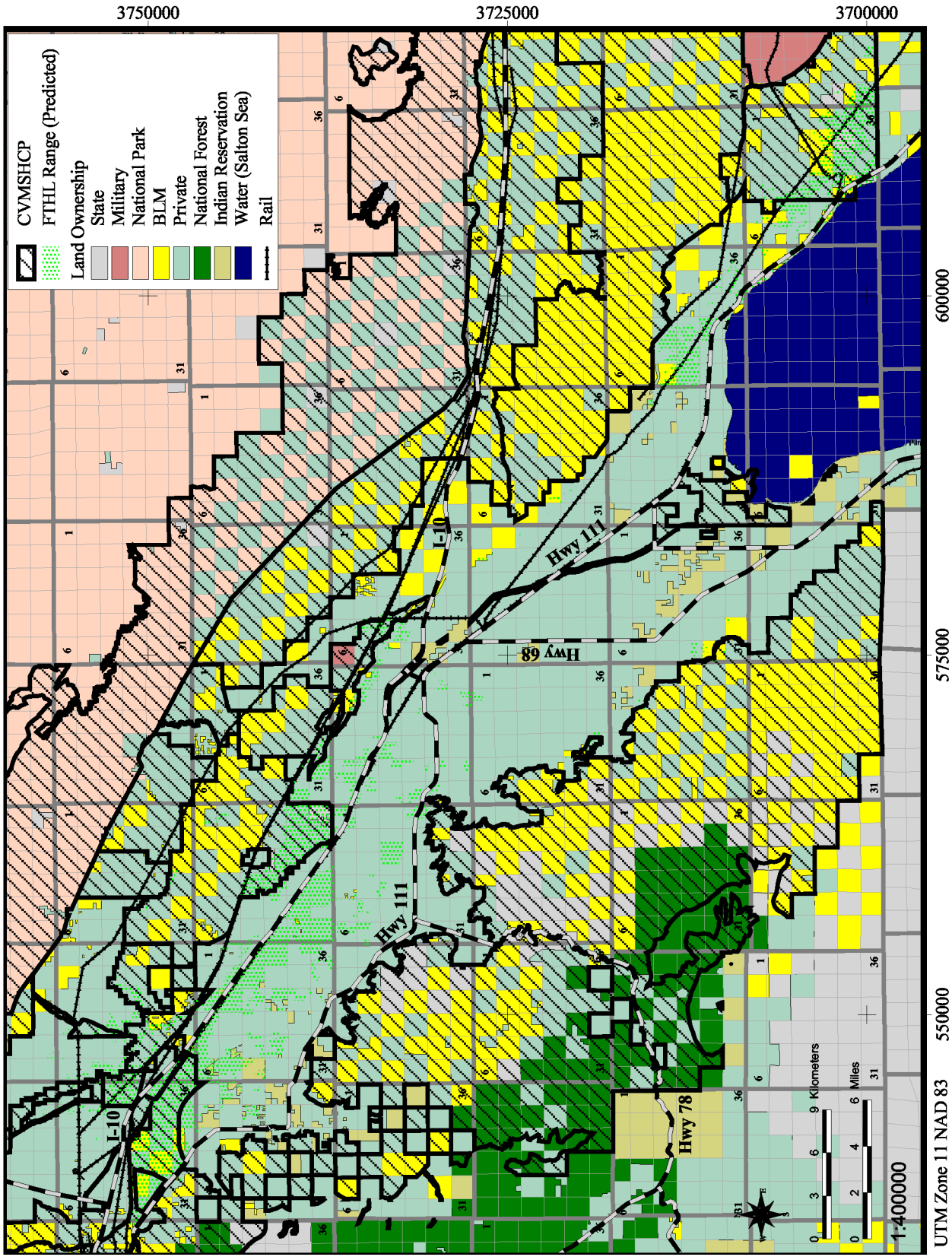


Figure 10. Coachella Valley Preserve System.



Mitigation

In accordance with Planning Action 2.1.1, the following mitigation measures shall be incorporated into all projects where applicable based on the Project Evaluation Protocol in Appendix 6. The measures are to be modified to conform to the nature of the project.

1. To the extent possible, surface-disturbing projects shall be located outside of FTHL MAs and the RA, and shall be timed to minimize mortality. If a project must be located within a MA or RA, effort shall be made to locate the project in a previously disturbed area or in an area where habitat quality is poor. A survey of the project site shall be conducted prior to construction in order to assist in locating the project.

2. Prior to project initiation, an individual shall be designated as a field contact representative. The field contact representative shall have the authority to ensure compliance with protective measures for the FTHL and will be the primary agency contact dealing with these measures. The field contact representative shall have the authority and responsibility to halt activities that are in violation of these terms and conditions.

3. All project work areas shall be clearly flagged or similarly marked at the outer boundaries to define the limit of work activities. All construction and restoration workers shall restrict their activities and vehicles to areas that have been flagged to eliminate adverse impacts to the FTHL and its habitat. All workers shall be instructed that their activities are restricted to flagged and cleared areas.

4. Within FTHL habitat, the area of disturbance of vegetation and soils shall be the minimum required for the project. [If possible, specify a maximum disturbance allowable based on the specifics of the project.] Clearing of vegetation and grading shall be minimized. Wherever possible, rather than clearing vegetation and grading the ROW, equipment and vehicles shall use existing surfaces or previously disturbed areas. Where grading is necessary, surface soils shall be stockpiled and replaced following construction to facilitate habitat restoration. To the extent possible, disturbance of shrubs and surface soils due to stockpiling shall be minimized.

5. Existing roads shall be used for travel and equipment storage whenever possible.

6. Where feasible and desirable, in the judgment of the lead agency, newly created access routes shall be restricted by constructing barricades, erecting fences with locked gates at road intersections, and/or by posting signs. In these cases, the project proponent shall maintain, including monitoring, all control structures and facilities for the life of the project and until habitat restoration is completed.

7. A biological monitor shall be present in each area of active surface disturbance throughout the work day from initial clearing through habitat restoration, except where the project is completely fenced and cleared of FTHLs by a biologist (see Measure 8). The biological monitors shall meet the requirements set in Appendix 6. The monitor(s) shall perform the following functions:

    a) Develop and implement a worker education program. Wallet-cards summarizing this information shall be provided to all construction and maintenance personnel. The education program shall include the following aspects at a minimum:

- biology and status of the FTHL,
- protection measures designed to reduce potential impacts to the species,
- function of flagging designating authorized work areas,
- reporting procedures to be used if a FTHL is encountered in the field, and
- importance of exercising care when commuting to and from the project area to reduce mortality of FTHLs on roads.

b) Ensure that all project-related activities comply with these measures. The biological monitor shall have the authority and responsibility to halt activities that are in violation of these terms and conditions.

c) Examine areas of active surface disturbance periodically (at least hourly when surface temperatures exceed 85ºF) for the presence of FTHLs. In addition, all hazardous sites (e.g., open pipeline trenches, holes, or other deep excavations) shall be inspected for the presence of FTHLs prior to backfilling.

d) Work with the project supervisor to take steps, as necessary, to avoid disturbance to FTHLs and their habitat. If avoiding disturbance to a FTHL is not possible or if a FTHL is found trapped in an excavation, the affected lizard shall be captured by hand and relocated.

8. Sites of permanent or long-term (greater than one year) projects in MAs where continuing activities are planned and where FTHL mortality could occur, may be enclosed with FTHL barrier fencing to prevent lizards from wandering onto the project site where they may be subject to collection, death, or injury. Barrier fencing should be in accordance with the standards outlined in Appendix 7. After clearing the area of FTHLs (also see Appendix 7), no on-site monitor is required (see Measure 7).

9. The project proponent shall develop a project-specific habitat restoration plan under approval by the lead agency. The plan shall consider and include as appropriate the following methods: replacement of topsoil, seedbed preparation, fertilization, seeding of species native to the project area, noxious weed control, and additional erosion control (see Habitat Rehabilitation, p. 69). Generally, the restoration objective shall be to return the disturbed area to a condition that will perpetuate previous land use. The project proponent shall conduct periodic inspection of the restored area. Restoration shall include eliminating any hazards to FTHLs created by construction, such as holes and trenches in which lizards might become entrapped. Disturbance of existing perennial shrubs during restoration shall be minimized, even if such shrubs have been crushed by construction activities.

10. Construction of new paved roads shall include a lizard barrier fence on each side of the road that is exposed to occupied FTHL habitat. Exceptions may occur in accordance with the following evaluation, to be applied separately to each side of the road. This prescription may also be applied to canals or other fragmenting projects.

Side is made nonviable for FTHLs even if connected to the other side:

- Compensate for the entirety of the fragmented parcel.

Side is viable only if connected to the other side:

- Compensate for the entirety of the fragmented parcel, or
- Provide fencing and effective culverts or underpasses that will maintain connectivity.

Side is viable even if not connected to the other side:

- Provide fencing (no culverts)

Specifications for barrier fences are provided in Appendix 7. The FTHL ICC will make the determination of FTHL population viability based on the size, configuration, and habitat condition of the isolated parcel, threats from adjacent lands, and existing scientific evidence of edge effects on FTHL. Culvert design will be provided by the FTHL ICC.

Compensation

Pursuant to Title 43 Code of Federal Regulations and the Federal Land Policy and Management Act of 1976, federal land management agencies may permit actions that result in FTHL habitat loss on their lands. To mitigate such losses both within and outside MAs, compensation is charged if residual effects would occur after all reasonable on-site mitigation has been applied. Signatories may use compensation funds to acquire, protect, or restore FTHL habitat both within and contiguous with MAs (with MOG approval). These actions will help ensure the existence of FTHLs and their habitat in the future.

Determining Whether Compensation Is Required

When compensation is required

If adverse effects remain after the project proponent has taken all reasonable on-site mitigation measures, a project proponent must compensate for the remaining (residual) on-site effects. To evaluate whether it is appropriate to collect compensation, agency biologists must consider whether the impacted area can potentially support FTHLs based on habitat factors favorable to FTHLs (Appendix 6). If agency biologists determine that the project area can potentially support FTHLs, then compensation shall be required. Negative FTHL survey results in the project area shall be irrelevant in the determination of whether to charge compensation because FTHLs can re-occupy the suitable FTHL habitat in the future, or FTHLs were present but not detected due to their cryptic nature.

When compensation is not required

Situations when compensation is not required include the following. First, a project proponent does not need to compensate if the proposed disturbance would not occur in suitable FTHL habitat (e.g., compacted ground, small lots surrounded by urban development, or riparian areas). However, if the project area contains both suitable and unsuitable habitat, agency biologists may base compensation on the entire project area because FTHLs may use unsuitable habitat (e.g., paved or dirt roads or fringes of agricultural fields) adjacent to suitable habitat.

Second, a project proponent does not need to compensate if the agency biologist has determined that mitigation measures have eliminated all adverse, on-site effects (i.e., there are no residual effects).

Third, a project proponent does not need to compensate for disturbances if the signatory authorized the project (e.g., a lease or ROW) before June 1997 (when the signatory signed the conservation agreement), and no longer maintains regulatory discretion to impose compensation. For example, if a signatory granted a ROW to a proponent before June 1997, and the proponent disturbs land within their ROW, the proponent does not need to pay compensation. However, if the signatory renews a permit or ROW authorization, the signatory should require proponents to follow the RMS under the renewed agreement.

Last, signatories to the RMS do not need to compensate for their own disturbances because they are already contributing significant resources towards FTHL conservation. However, if a signatory disturbs over 1% of a FTHL MA (see Planning Action 2.2.1 for details), the signatory must pay compensation based on the compensation formula described below for that exceeded disturbance.

Compensation Determination

Compensation basis

The goal of compensation is to prevent the net loss of FTHL habitat and make the net effect of a project neutral or positive to FTHLs by maintaining a habitat base for FTHLs. To achieve this goal, compensation will be based on the acreage of FTHL habitat lost to a project proponent's impacts on signatory land after all reasonable on-site mitigation has been applied. Compensation for habitat lost outside a FTHL MA will be charged at a 1:1 ratio. When a project proponent's impacts are inside a FTHL MA, a multiplying factor ranging from three to six will be applied to the affected acreage to obtain an adjusted compensation acreage.

This multiplying factor **(M)** for disturbances inside FTHL MAs will be determined by the following formula:

$$M = 3 + A + G + E + D$$

where the factors are evaluated as shown below:

A Adjacent habitat impacts:

a) Adjacent lands will not be affected. 0
b) Adjacent habitat will receive direct or indirect deleterious impacts.....0.5

G Growth inducing effects within flat-tailed horned lizard habitat:

a) The project will have no growth inducing effects. 0
b) The project will have growth inducing effects.....0.5

E Existing disturbance on site:

a) There is moderate to heavy existing habitat disturbance.....0
b) There is little or no existing habitat disturbance. 1

D Duration of effect:

a) The effects of the project are expected to be short term

(< 10 years). 0
b) The effects of the project are expected to be long term
(> 10 years). 1

Signatories should require project proponents to replace the acreage or adjusted acreage lost to the project proponent's impacts. However, signatories may convert either the compensation acreage or adjusted compensation acreage to a monetary equivalent (including administrative costs) that is required to replace the acreage or adjusted acreage. The per acre dollar figure for compensation fees shall be based on the cost of acquiring lands prioritized for acquisition by signatory agencies.

If signatories cannot replace the land disturbed by proponents because lands within FTHL MAs haven't been appraised or there are no more lands available for acquisition (Yuma Desert MA), signatories can charge fair market value of the impacted land and any costs associated with appraising the impacted land. Minimum compensation shall be $200.

Unique Compensation Circumstances

Some land actions have unique circumstances or impacts to FTHLs, and therefore determining the acreage of impact often will depend on the circumstance. Some examples of unique circumstances in common land actions are listed below.

Land disposal

Federal regulation provides for public lands to be made available for disposal via the Recreation and Public Purposes Act. Such land leases and patents are discretionary actions that require both NEPA and Endangered Species Act compliance. Federal land management agencies endeavor to retain ownership of land that provides habitat for sensitive species. However, if a case arises where public lands within FTHL habitat are to be disposed, the signatory disposing the land will collect compensation for the entire acreage regardless if the proponent intends to disturb only a portion of the land because there is no guarantee that the undisturbed portion will remain habitat for FTHLs.

Indirect effects

A project's indirect effects on FTHLs should be considered when determining compensation. For example, ROW grants for aboveground structures such as roads, pipelines, towers, or similar facilities can have adverse impacts to FTHLs beyond the areas that are proposed to be disturbed. First, such disturbances have been shown to attract FTHL predators. For example, roads may attract round-tailed ground squirrels (Garland and Bradley 1984), and towers can provide perching areas for loggerhead shrikes and American kestrels. Second, construction vehicles can introduce invasive weeds that degrade FTHL habitat. Last, vehicles from increased authorized and unauthorized traffic on maintenance roads can cause FTHL mortality. If these and other adverse indirect effects (e.g., habitat fragmentation, decreased FTHL density near roads) cannot be mitigated (with FTHL barriers or corridors, for e.g.), compensation for indirect effects will be required.

Boundaries of MAs

In areas where a MA boundary is defined by a road, the road ROW (not the road itself) will be considered to be the boundary for the MA. Consequently, compensation for residual effects within the ROW will be 1:1.

Recovered FTHL Habitat

Over time, disturbed habitat may recover from a project's residual effects and again become suitable FTHL habitat. If a subsequent project disturbs the recovered area again, the proponent (regardless of whether they were the original proponent) will still be required to pay compensation for residual effects.

Reopening of Mines along the East Highline Canal

For sites that have previously been mined along the East Highline Canal, either inside or outside of the East Mesa MA, compensation shall be charged at a 1:1 ratio if the applicant is not intending to fully mine and complete final reclamation of the site. Compensation shall not be charged if the applicant will be reclaiming the site and no further mining would occur.

Compensation Fund Accounts

Each of the signatories shall maintain an accounting of all compensation funds paid and collected. These accountings shall be incorporated into the annual monitoring report. The BLM shall act as a clearinghouse for all compensation funds and accounting data. Project proponents will pay the BLM through the signatory that authorizes the project. The signatory should give the check to the BLM field office (El Centro or Yuma) that manages the nearest FTHL MA. In addition, the signatory should also provide the secretary of the ICC a completed pre-project and post-project (if appropriate) reporting form for projects/activities that disturb FTHL habitat. The forms are provided in Appendix 8.

Use Of Funds

The agency to receive the compensation land or fee shall be determined through coordination among the permitting agencies. Typically, the compensation fee or land will go to the agency that predominantly manages the nearest MA. Pre-authorized and unauthorized uses are listed below. This list is not exclusive and the MOG, in consultation with the ICC, will ultimately decide how to use compensation funds for unlisted uses.

Pre-authorized uses of funds

Signatories can fund a variety of actions with compensation funds, but funds must directly benefit FTHLs or their habitat within or contiguous with FTHL MAs.

There are several approved uses of compensation funds, but the top priority shall be acquisition of inholdings within the nearest MA (see Planning Action 4). If opportunities for acquisition have been exhausted, examples of activities that could be carried-out with compensation funds include the following:

- Transfer funds to other MAs to purchase FTHL habitat, especially FTHL habitat within or contiguous with MAs that are threatened with imminent impacts.
- Construct and maintain fences and signs around MAs to prevent OHVs from entering and degrading FTHL habitat (see Planning Action 2.4.2). In addition, these fences could be designed to physically prevent FTHLs from leaving the MAs and encountering nearby roads (Appendix 7).
- Educate people and organizations about the effects of OHV use (see Planning Action 7.2). Educators should target those audiences most likely to travel off-road, such as

the public, BP, and utility companies.
- Restore degraded FTHL habitat within or contiguous with MAs (see Planning Action 3).
- Fund other management actions deemed necessary by the ICC and MOG.

Essentially, funds that cannot be used to purchase FTHL habitat within or contiguous with MAs can be used to accelerate implementation of actions identified in the implementation schedule (e.g., expending $100,000 in FY03 for habitat rehabilitation, instead of $40,000 as currently scheduled).

Unauthorized uses of funds

Funds should not be used in place of other agency funding that is obligated or programmed to carryout planning actions listed in the implementation schedule. For example, signatories shall not fund law enforcement and FTHL research/monitoring with compensation funds because signatories to this document have agreed to implement monitoring and law enforcement activities with their own funds.

Monitoring Program

In accordance with the first objective of this RMS (to "maintain a 'long-term stable' or increasing population of FTHLs in all MAs"), a population monitoring program has been implemented to learn how FTHL populations are changing over time. Determining whether there is a trend means obtaining accurate measurements of the populations over time, then removing "the effects of natural demographic and environmental stochasticity." Such effects are currently unknown; hence the monitoring also has a goal to document the variability in FTHL populations in response to natural processes (such as drought cycles).

Monitoring cannot reveal the actual causes of a population trend (Elzinga *et al.* 1998). However, by monitoring habitat disturbance in addition to population and distribution, correlations can be made between population change and one potential cause for decline. Even without conclusive proof of its cause, if a population or distribution decline of >30% is noted within any MA, and factors other than climate are the potential cause, the ICC will draft management prescriptions to reverse the trend. If declines are correlated with increased habitat disturbance from OHV use (documented either through ground surveys or aerial monitoring), signatory agencies will take measures to limit OHV traffic. If statistical proof of causal relationships is deemed necessary, the costs of implementing a research program with replicated controls and treatments will be evaluated.

The foundation for an inventory and monitoring program was laid in 1978 with surveys conducted on East Mesa, West Mesa, and Yuha Basin (Turner *et al.* 1978). Some monitoring has been conducted every year since then except 1980, 1982, and 1983. Distribution and relative abundance of FTHLs were estimated through much of the range of the species in California and Arizona by use of standardized 3-mile triangular transects in which numbers of FTHLs and their scat were counted and used as an index to relative abundance (Turner and Medica 1982; Rorabaugh *et al*. 1987; Olech undated; BLM and CDFG 1990; Wright 1993). Scat transect methods were standardized in 1990 (BLM and CDFG 1990). Trends on BLM-administered lands have been analyzed periodically (Olech 1986; Wright 1993, 2002). In addition to BLM-administered lands,

inventories of the Navy target areas (Dames & Moore 1995; Rorabaugh 1996b), Salton Sea Naval Base (Muth and Fisher 1989; Rorabaugh 1996c) and OWSVRA (Wone *et al*. 1994; Wone *et al.* 1995; Wone and Beauchamp 1995a, 1995b) have been conducted.

Two critical assumptions of the scat transect survey method are 1) FTHL scat is readily distinguishable from other lizard's scat, and 2) scat and lizard counts are correlated with FTHL density.

The first assumption is largely met by not counting scat less than 5.5 mm in diameter (Muth and Fisher 1992) and not using scat counts to estimate relative density in areas where desert horned lizards occur (desert horned lizard scat is indistinguishable from FTHL scat) (Turner and Medica 1982).

The second assumption has been problematic. The relationship between scat counts and horned lizard density has been difficult to examine due to the problems associated with obtaining true FTHL density estimates. But several reports suggest that if scat is correlated with lizard density, the relationship may be weak (Muth and Fisher 1992; Rorabaugh 1994; Beauchamp *et al.* 1998). Wright (1993) found a correlation between FTHL counts and scat; however, the relationship between lizard counts and relative abundance is unknown. Use of lizard count data to estimate relative density is suspect due to the infrequency with which FTHLs are observed on triangular scat transects (on average less than one animal per 10 hours of searching) (Turner and Medica 1982; Rorabaugh *et al*. 1987) and because environmental conditions are likely to influence FTHL activity and detectability. Scat counts in the same area may fluctuate greatly from year to year (Wright 1993; Rorabaugh 1994), but there are factors other than lizard density that affect numbers of scat that are produced and visible (Muth and Fisher 1992; Rorabaugh 1994; Young 2002). Beauchamp *et al.* (1998) note that the presence of several scat in an area suggests two indistinguishable alternatives: either a single individual used the area repeatedly and the scat persisted, or multiple individuals have used the area over a shorter time span.

Due to the animal's cryptic nature, monitoring efforts typically yield highly variable, low encounter rates, making analysis of monitoring data problematic. In a recent analysis of 1979-2001 FTHL monitoring data, no population trends were detected despite increases in habitat disturbance (Wright 2002). It was noted that inconsistencies between observers and changes in monitoring protocols added to the difficulties of detecting trends. Because of known problems with scat surveys and lizards encountered on line transects, new monitoring methods were called for (Foreman 1997).

Two new monitoring techniques are being implemented as part of this first revision. Implementation of these revised monitoring methods should increase sensitivity to detecting future trends. The first is an improved mark/recapture population monitoring technique developed by Wright and Grant (2002) (see Appendix 4). Using this technique, they estimated a population of about 30,000 FTHLs (95% CI: 21,500 – 33,000) in the Yuha Desert MA during the summer of 2002, with an average density of 1.3 lizards per hectare (0.5 per acre). Percent sand coverage was the only variable significantly correlated with population size. This technique has yielded the best wide-scale population estimate to date.

Pronounced natural fluctuations and potentially large confidence intervals may still mask detection of long-term population trends. Additionally, the small number of mark/recapture plots may be insufficient for detecting localized population declines, such as on the edges of MAs. In

addressing these problems, the ICC felt that monitoring changes in FTHL distribution and changes in habitat disturbance could supplement monitoring population trends, to provide a more sensitive indicator of unnatural population declines. Distribution may be monitored by gathering presence/absence data (Appendix 5). These data, in conjunction with GIS overlays, can be used to create a predictive spatial model using StatMod (Garrard 2002), which will aid in detecting declines in distribution and may serve to tighten the population estimates obtained from the mark/recapture surveys.

The protocols for monitoring population and distribution both include measuring disturbance at the sample sites. In addition to those measures, wide-scale (aerial) monitoring of surface disturbance will occur every five years (see Planning Action 9.2.3.1).

It is anticipated that a population estimate from mark/recapture will be obtained from each MA during the next five years, which will allow for evaluation of this technique as a long-term monitoring tool. The distribution monitoring protocol is yet untested. It is recommended that it be implemented on a trial basis (e.g. in one MA for two years) and evaluated by the ICC to determine whether to expand the sampling. Following these new protocols over the next five years will establish baseline estimates against which future comparisons can be made. It is anticipated that during the 2007 revision of this document, the baseline data will be carefully reviewed and the ICC will determine whether or not they can set population and distribution thresholds which, if reached, would act as a stimulus for more drastic management efforts.

Restorative Measures

The following restorative measures are prescribed in the Planning Actions and are explained in more detail in this section. A discussion of how these measures were implemented can be found in the Summary of Management Strategy Implementation, 1997-2002, under actions 2, 3, and 5.

Route Closures

To reduce direct mortality from vehicles and to limit the increase in surface disturbance from the proliferation of routes, each discretionary, designated route in a MA shall require justification for the necessity of the route. Designated routes shall be prioritized in terms of importance to FTHLs and to the OHV community and other public and private route users. Redundant, low priority, and non-essential routes in MAs shall be closed and restored.

The following process will be utilized to reduce route density in MAs:

Step 1 - A small, interdisciplinary team shall be formed. The team should include, at a minimum, biological and recreation staff from the land management agency and representatives of USFWS, the state wildlife agency, the state OHV recreation agency, and important user groups. Other management agency staff, such as surface protection specialist or realty specialist, may be added as desirable.

Step 2 - The team shall identify non-discretionary routes (e.g., routes with existing ROWs) and discretionary routes (i.e., routes that can be closed at the discretion of the land management agency).

Step 3 - Representatives of users of routes shall assign an importance priority to each discretionary route. A written justification for each desired open route shall be prepared.

The team shall evaluate route densities and priorities, FTHL population density and trend data, FTHL home range size, and habitat disturbance attributed to routes to determine the level of route closures needed to ensure viable populations of FTHLs. Areas within MAs that support high levels of vehicular use and that are particularly important for the FTHL shall be identified as high priority areas for route closure.

Step 4 - Within areas identified for route closure, the team shall identify discretionary routes needing closure. Any discretionary route that serves no identifiable purpose, parallel routes, routes with no identifiable destination, and routes with high resource damage shall also be recommended for closure. Routes along utility corridors and canals and routes used by agencies (e.g., BP access) shall be evaluated for closure except to specific, authorized users.

Step 5 - All necessary federal and state environmental reviews shall be completed.

Step 6 - Closed routes shall be signed, as necessary, and restored.

Habitat Rehabilitation

Damaged and degraded areas in the desert may take centuries to recover their original appearance and ecosystem function without intervention. Preparation of the ground surface and replanting of vegetation may speed the restoration of the native flora, the rebuilding of the soil structure, and the reestablishment of native wildlife. Available techniques are reviewed in Lovich (1993).

Lovich and Bainbridge (1999) estimate low-intensive restoration efforts can cost $30,000 to $62,000 per acre. Besides being expensive, plants often die after re-vegetation efforts because of unknown, unpredictable, or uncontrollable environmental factors (e.g., drought or unsuitable soil conditions). Given the cost, recovery time, and the low to moderate probability of long-term success of restoration efforts, it is more effective to limit the extent and intensity of the initial impacts to the land (Lovich and Bainbridge 1999). Nonetheless, there are times when habitat rehabilitation is worthwhile. When a decision has been reached to restore a degraded area within an MA, and the underlying causes of habitat degradation have been removed (such as closing routes of travel), the most effective rehabilitation techniques known must be used. Since little is known about the habitat factors that benefit FTHL, initial rehabilitation efforts should be planned in an experimental fashion and the results of various treatments should be well documented so they can be improved upon over time.

Corridors

It is recognized that the Colorado River has been a long-term, natural barrier between populations in Arizona and California, and that this may have resulted in genetic divergence (see Figure 2). During the past century, the populations in East Mesa were effectively isolated from those to the west and south by the Salton Sea, extensive agricultural development, canals, and highways. However, managed areas to the west (i.e., Yuha Desert, West Mesa, Ocotillo Wells, and Borrego Badlands) lie relatively close to one another, and some movement between MAs may occur. Populations in the Coachella Valley are probably currently disjunct from those in the Imperial and

Borrego valleys. Planned actions provide guidance for managers to maintain sufficient habitat to provide for interchange of FTHLs between MAs, where habitat corridors persist. In this way, those naturally adjoining populations of FTHLs will be able to interbreed, helping to maintain genetic vigor, and natural recolonization could occur in the case of extirpation from local populations.

LITERATURE CITED

Adams, J.A., and A.S. Endo. 1980. Soil impacts from off-road vehicles. Chapt. 1, pp. 1-45 in P.G. Rowlands (Ed.), Effects of disturbance on desert soils, vegetation, and community processes with emphasis on off-road vehicles - a critical review. Unpubl. BLM Rept., Riverside, Calif.

Adams, J.A., A.S. Endo, L.H. Stozy, P.G. Rowlands, and H.B. Johnson. 1982. Controlled experiments on soil compaction produced by off-road vehicles in the Mojave Desert, California. Journ. of Applied Ecol. 19:167-175.

Arizona Game and Fish Department. In prep. Wildlife of special concern in Arizona. Ariz. Game and Fish Dept. Publication. Phoenix, Arizona.

Barrows, C. 2002. Peer Review Comments: The Proposal to List the Flat-tailed Horned Lizard as Threatened and Withdrawal of that Proposal. Letter to USFWS, Carlsbad, Calif.

Bauder, E.T., and A. Larigauderie. 1991. Rehabilitation success and potential of Mojave and Colorado Desert sites. Rept. to Calif. Dept. of Parks and Rec., Off-Highway Motor Veh. Rec. Div., Sacramento, Calif.

Beatley, J.C. 1967. Survival of winter annuals in the northern Mohave Desert. Ecology 48(5):745-750.

Beauchamp, B., B. Wone, S. Bros, and M. Kutilek. 1998. Habitat use of the flat-tailed horned lizard (*Phrynosoma mcallii*) in a disturbed environment. Journal of Herpetology 32:210-216.

Berry, K.H. 1996. The effects of off-road vehicles on animal populations and habitats: a review of the literature. USGS, Biological Resources Division, Riverside Field Station, Riverside, Calif.

Bock, C.E., H.M. Smith, J.H. Bock. 1990. The effect of livestock grazing upon abundance of the lizard, *Sceloporus scalaris*, in southeastern Arizona. Journal of Herpetology 24(4):445-446.

Bolster, B., and K. Nicol. 1989. The status of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California. Rept. to CDFG, Sacramento, Calif.

Bondello, M.C. 1976. The effects of high-intensity motorcycle sounds on the acoustical sensitivity of the desert iguana, *Dipsosaurus dorsalis*. Thesis submitted Calif. St. Univ., Fullerton. 39pp.

Boundy, J., and T.G. Balgooyen. 1988. Record lengths for some amphibians and reptiles from the western United States. Herpetological Review 19(2):26-27.

Bransfield, R., and J. Rorabaugh. 1993. Final fish and wildlife coordination act report, All-American Canal lining project, Imperial County, California. Rept. to Bur. of Reclamation, Boulder City, Nev.

Brattstrom, B.H. 1978. Bibliography on the effect of noise on non-human vertebrates. Contr. Rpt. CA-060-CT7-2737 from BLM, Riverside, Calif.

Brattstrom, B.H., and M.C. Bondello. 1983. Effects of off-road vehicle noise on desert vertebrates. Chapt. 9, pp. 167-221 in R.H. Webb and H.G. Wilshire (eds.) Environmental Effects of Off-road Vehicles: Impacts and Management on Arid Regions. Springer-Verlag, New York.

Brown, D.E., and R.A. Minnich. 1986. Fire and changes in creosote bush scrub of the western Sonoran Desert, California. Amer. Midland Naturalist 116:411-422.

Brown, J.H., O.J. Reichman, and D.W. Davidson. 1979. Granivory in desert ecosystems. Ann. Rev. Ecol. Syst. 10:201-27.

Bureau of Land Management. 1980. California Desert Conservation Area Plan. BLM, Riverside, Calif.

Bureau of Land Management. 1981. Yuha Basin ACEC Management Plan. BLM, El Centro, Calif.

Bureau of Land Management. 1982a. Southern East Mesa Area of Critical Environmental Concern (ACEC) Management Plan. BLM, El Centro, Calif.

Bureau of Land Management. 1982b. East Mesa Wildlife Habitat Management Plan. BLM, El Centro, Calif.

Bureau of Land Management. 1983. Yuha Desert Wildlife Habitat Management Plan. BLM, El Centro, Calif.

Bureau of Land Management. 1985. Yuha Desert Management Plan. BLM, El Centro, Calif.

Bureau of Land Management. 1986a. San Sebastian Marsh/San Felipe Creek Management Plan. BLM, El Centro, Calif.

Bureau of Land Management. 1986b. Proposed 1985 Plan Amendments. Vol. 2. BLM Riverside, Calif.

Bureau of Land Management. 1987a. Yuma District Resource Management Plan. BLM Yuma, Ariz.

Bureau of Land Management. 1987b. Algodones Dunes Wildlife Habitat Management Plan. BLM El Centro, Calif.

Bureau of Land Management. 1988. BLM Manual 6840 - Special status species management. Release 6-116, Sept 16, 1988.

Bureau of Land Management. 1990. Lower Gila South Resource Management Plan (Goldwater Amendment). BLM Phoenix, Ariz.

Bureau of Land Management. 1992. Yuma District Resource Management Plan Amendment. BLM Yuma, Ariz.

Bureau of Land Management. 1994a. Yuma District (Bill Williams) Resource Management Plan Amendment. BLM, Yuma, Ariz.

Bureau of Land Management. 1994b. Yuma District (Havasu) Resource Management Plan Amendment. BLM, Yuma, Ariz.

Bureau of Land Management. No date. Yuma District (Lands) Resource Management Plan Amendment. BLM, Yuma, Ariz.

Bureau of Land Management. 1997. Lechuguilla Mohawk Habitat Management Plan. BLM, Yuma, AZ.

Bureau of Land Management. 1998. Lower Gila South Resource Management Plan. BLM, Yuma, AZ.

Bureau of Land Management, U.S. Fish and Wildlife Service, California Department of Fish and Game, California Department of Parks and Recreation, and The Nature Conservancy. 1995. The Coachella Valley Preserve System Management Plan and Decision Record. Interagency Rept.

Bureau of Land Management and California Department of Fish and Game. 1990. Flat-tailed horned lizard management plan. Rept. to BLM and CDFG, Riverside, Calif.

Bureau of Land Management, U.S. Fish and Wildlife Service, and California Department of Fish and Game. 1989. Environmental assessment for selected control of the common raven to reduce desert tortoise predation in the Mojave Desert, California. BLM, Riverside, Calif.

Bureau of Reclamation and Imperial Irrigation District. 1990. Draft environmental impact statement/environmental impact report, All American Canal Lining Project, Imperial County, California. Lower Colorado Reg. Off., Boulder City, Nev., and Imperial Irrigation Dist., Imperial, Calif.

Bury, R.B., R.A. Luckenbach, and S.D. Busack. 1977. Effects of off-road vehicles on vertebrates in the California desert. Fish and Wildlife Service, Wildl. Res. Rept. 8, Washington, D.C.

Bryant, H.C. 1911. The horned lizards of California and Nevada of the genera *Phrynosoma* and *Anota*. Univ. California Publ. Zool. 9(1):1-84.

California Department of Food and Agriculture. 1991. Environmental assessment of curly top virus control in California, 1991-1995. Calif. Dept. of Food and Agric., Sacramento, Calif.

California Department of Food and Agriculture. 1995. (Preliminary Draft) Joint environmental assessment 1997-2001 of the California Department of Food and Agriculture Curly Top Virus Control Program for the Bureau of Land Management and Department of Energy. Calif. Dept. of Food and Agric., Sacramento, Calif.

California Department of Food and Agriculture. 2002. Joint environmental assessment 2002-2006 of the California Department of Food and Agriculture Curly Top Virus Control Program for the Bureau of Land Management and Department of Energy. Calif. Dept. of Food and Agric., Sacramento, Calif. DOE/EA# 1363.

Carlson, B.A., and W.W. Mayhew. 1988. A petition to the State of California Fish and Game Commission (*Phrynosoma mcallii*). Univ. of Calif., Riverside, Calif.

Carr, L.W., and L. Fahrig. 2001. Effect of road traffic on two amphibian species of differing vagility. Conservation Biology 15(4):1071-1078.

Collet, R. J. 2002. *Phrynosoma mcallii* hybrids. Unpubl. presentation *in* 5th Horned Lizard Symposium, Portal, Ariz.

Dames & Moore. 1995. Results of flat-tailed horned lizard surveys for target areas on Naval Air Facility El Centro Ranges 2510 & 2512. Contract Rept. N68711-91-C-0059. 8pp.

Davidson, E., and M. Fox. 1974. Effects of off-road motorcycle activity on Mojave Desert vegetation and soil. Madrono 22(8):381-412.

Duck, T.A., T.C. Esque, and T.J. Hughes. 1994. Fighting wildfire in desert tortoise habitat: considerations for land managers. Pp. 48-67 In Ann Fletcher-Jones (ed.), Desert Tortoise Council, Proceedings of the 1994 Symposium.

Duncan, R.B., T.C. Esque, and K.I.Inserra-Echols. 1994. *Phrynosoma mcallii* (flat-tailed horned lizard) predation. Herp. Review 25(2):68

Elzinga, C. L., D. W. Salzer, and J. W. Willoughby. 1998. Measuring and Monitoring Plant Populations. Final BLM Technical Reference 1730-1, Bur. of Land Mgmt.

ESRI. 1998. ArcView GIS Version 3.1. Environmental Systems Research Institute, Redlands, Calif.

Fisher, M. W. Hodges, A. Holycross, J. Howland, J. Lovich, P. Medica, A. Muth, J. Rorabaugh, F. Turner, B. Wone, and L. Vitt. 1998. Flat-tailed horned lizard, *Phrynosoma mcallii*, population viability analysis: implications for conservation strategies and research priorities. Unpubl. 20 pp. + Appendices.

Foreman, L.D. (Ed.). 1997. Flat-tailed horned lizard rangewide management strategy. Report of interagency working group. 61 pp. plus appendices.

Funk, R.S. 1965. Food of *Crotalus cerastes lateorepens* in Yuma County, Arizona. Herpetologica 21(1):15-17.

Funk, R.S. 1981. *Phrynosoma mcallii*. cat. American Amphib. and Reptiles. 281:1-2.

Gardner, S.A. 2002. Analyses of diet and geographic variation in leaf-nosed snakes, *Phyllorhynchus.* M.S. Thesis. Utah State University, Logan, Utah.

Gardner, T. J. 2002. A Scientific Study of the Flat-tailed Horned Lizard (*Phrynosoma mcallii*) at the OWSVRA: Final Report-01 March 2002. California State Department of Parks and Recreation, Off-Highway Motor Vehicle Division, Sacramento, Calif.

Gardner, T. J., and D. H. Foley III. 2001. Final report: survey for flat-tailed horned lizards, *Phrynosoma mcallii*, at the Naval Air Facility. U.S. Navy Agreement No. N68711-98-LT-80030, El Centro, Calif.

Gardner, T. J., K. V. Young, and D. H. F. III. 2001. Final report: management-based study of the flat-tailed horned lizard, *Phrynosoma mcallii*. U.S. Bureau of Reclamation Grant Agreement No. 00FG340008.

Garland, T.J., and W.G. Bradley. 1984. Effects of a highway on Mojave Desert rodent populations. American Midland Naturalist 111:47-56.

Garrard, C. 2002. StatMod: A tool for interfacing ArcView® GIS with statistical software to facilitate predictive ecological modeling. M.S. Thesis. Utah State University, Logan, Utah. (software available at http://bioweb.usu.edu/gistools/statmod/)

Giles, R.H., Jr. 1970. The ecology of a small forested watershed treated with the insecticide Malathion-s35. Wildl. Monograph No. 24.

Gonzáles-Romero, A., and S. Álvarez-Cárdenas. 1989. Herpetofauna de la region del Pinacate, Sonora, Mexico: un inventario. Southwestern Naturalist 34(4):519-526.

Grant, T., M. McGrann, J. Neilans, and G. Wright. 2001. A mark-recapture pilot study of the flat-tailed horned lizard, *Phrynosoma mcallii*, in the Yuha Basin of southeastern California. BLM Rept., El Centro Resource Area, Calif. 12 pp.

Hall, J.A. 1980. Direct impacts of off-road vehicles on vegetation. Chapt. 3, pp. 63-74 in P.G. Rowlands (Ed.), Effects of disturbance on desert soils, vegetation, and community processes with emphasis on off-road vehicles - a critical review. Unpubl. Bur. of Land Mgmt. Rept., Riverside, Calif.

Hall, R.J., and D.R. Clark. 1982. Responses of the Iguanid lizard *Anolis carolinensis* to four organophosphorus pesticides. Environ. Pollution (Series A) 28:45-52.

Henry, S. (ed.). 1999. Flat-tailed horned lizard Rangewide Management Strategy annual report. Bur. of Land Mgmt., Yuma, Ariz. 12 pp.

Hoddenbach, G.A., and F.B. Turner. 1968. Clutch size of lizard *Uta stansburiana* in southern Nevada. Amer. Midland Naturalist 80:262-265.

Hodges, W. L. 1995. *Phrynosoma mcallii* occurrence in Arizona. Contract Rept. No. Q95-15-K to Ariz. Game and Fish Dept., Phoenix, Ariz.

Hodges, W.L. 1997. Assessing *Phrynosoma mcallii* (flat-tailed horned lizard) habitat loss in Arizona and California. University of Texas, Austin, Tex.

Howard, C.W. 1974. Comparative reproductive ecology of horned lizards (Genus *Phrynosoma*) in southwestern United States and northern Mexico. J. Ariz. Acad. of Sciences 9:108-116.

Inouye, R.S. 1991. Population biology of desert annual plants. Pp. 27-54 In G.A. Polis (ed.), The Ecology of Desert Communities. Univ. of Ariz. Press, Tucson, Ariz.

Interagency Coordinating Committee. 1998. Annual report on flat-tailed horned lizard Rangewide Management Strategy. Unpubl. report. 11 pp.

Johnson, T.B. 1989. Flat-tailed horned lizard. Wildl. Views 89:15.

Johnson, T.B., and R.B. Spicer. 1985. *Phrynosoma mcallii* (Hallowell 1852) Flat-tailed horned lizard. Contr. Rept. No. 14-16-002-81-224 to USFWS, Albuquerque, N. Mex.

Jones, K.B. Effects of grazing on lizard abundance and diversity in western Arizona. The Southwestern Naturalist 26(2):107-115.

Klauber, L.M. 1939. Studies of reptile life in the arid southwest. Bull. Zool. Soc. San Diego 14:1-100.

Kutilek, M., H. Shellhammer, and W. Bros. 1991. Inventory, wildlife habitat protection program, and monitoring program for Ocotillo Wells State Vehicular Recreation Area, California. Contract Rept. No. 4-500-9035, Calif. Dept. of Parks and Recreation, Off-highway Motor Vehicle Recreation Division, Sacramento, Calif.

Lovich, J. E. 1993. Restoration and revegetation of degraded habitat as a management tool in recovery of the threatened desert tortoise. Unpubl. Rept. of Bur. of Land Mgmt., Riverside, Calif., for Calif. Dept. of Parks and Rec., Off-highway Motor Veh. Rec. Div.

Lovich, J.E. and D. Bainbridge 1999. Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration. Environmental Management (24). 309-326.

Luckenbach, R.A., and R.B. Bury. 1983. Effects of off-road vehicles on the biota of the Algodones Dunes, Imperial County, California. J. Applied Ecology 20:265-286.

MacKay, W.P. 1991. The role of ants and termites in desert communities. Pp. 113-150 In G.A. Polis (ed.), The Ecology of Desert Communities. Univ. of Arizona Press, Tucson, Ariz.

Marshall, R. M., S. Anderson, M. Batcher, P. Comer, S. Cornelius, R. Cox, A. Gondor, D. Gori, J. Humke, R. P. Aguilar, I. E. Parra, and S. Schwartz. 2000. *An Ecological Analysis of Conservation Priorities in the Sonoran Desert Ecoregion.* Prepared by The Nature Conservancy Arizona Chapter, Sonoran Institute, and Instituto del Medio Ambiente y el Desarrollo Sustentable del Estado de Sonora with support from Department of Defense Legacy Program, Agency and Institutional partners. 146 pp.

Mayhew, W.W. 1965. Hibernation in the horned lizard, *Phrynosoma M'callii*. Comp. Biochem. Physiol. 16:103-119.

Mayhew, W.W. 1967. Comparative reproduction in three species of the genus *Uma*. Pp. 45-65 In W. W. Milstead (ed.), Lizard Ecology: A Symposium. Univ. of Missouri Press.

Mayhew, W.W. 1968. Biology of desert amphibians and reptiles. Pp. 195-356 In G.W. Brown, Jr. (ed.), Desert Biology. Academic Press, New York. Vol. 1, 635pp.

Meffe, G.K. and C.R. Carroll. 1994. Principles of Conservation Biology. Sinauer Associates, Inc., Sunderland, Mass.

McCalvin, C. 1993. Surveys for seven rare plant species, the flat-tailed horned lizard, and the Colorado desert fringe-toed lizard. Rept. to Bur. of Reclamation, Boulder City, Nev.

Miller, P. A. 1999. Home range (?) of the flat-tailed horned lizard *Phrynosoma mcallii*. MS Thesis. Utah State University, Logan, Utah.

Minnich, R.A. 1994. Post-fire succession in desertscrub communities of Southern California. Pp. 93-112 In Ann Fletcher-Jones (ed.), Desert Tortoise Council, Proceedings of the 1994 Symposium.

Mitchell, N.C. 1999. Effect of introduced ungulates on density, dietary prefences, home range, and physical condition of the iguana (*Cyclura pinguis*) on Anegada. Herpetologica 55(1):7-17.

Muth, A., and M. Fisher. 1989. A report on the status of native lizards on the Salton Sea Naval Base, Imperial County, California. USFWS Contract Rept. PO-10120-87-350. 36pp.

Muth, A., and M. Fisher. 1992. Development of baseline data and procedures for monitoring populations of the flat-tailed horned lizard, *Phrynosoma mcallii*. Contr. Rept. No. FG9268 to Calif. Dept. of Fish and Game, Sacramento, Calif.

NAF El Centro. 2001. Integrated Natural Resources Management Plan for Naval Air Facility El Centro and Target Areas.

Nicolai, N.C. and J.E. Lovich. 2000. Preliminary observations of the behavior of male, flat-tailed horned lizards before and after an off-highway vehicle race in California. Cal. Fish and Game 86:208-212.

Nicholson, L. 1978a. The effects of roads on tortoise populations. Report to the Bureau of Land Management, Riverside, Calif. Contract No. CA-060-CT8-000024.

Nicholson, L. 1978b. The effects of roads on desert tortoise populations. Pages 127-129 *in* Proceedings of the 1978 Desert Tortoise Council Symposium.

Norris, K.S. 1949. Observations on the habits of the horned lizard *Phrynosoma mcallii*. Copeia 1949:176-180.

Norris, K.S., and C.H. Lowe, Jr. 1951. A study of the osteology and musculature of *Phrynosoma m'callii* pertinent to its systematic status. Bull. Chicago Acad. Sci. 9(7):117-125.

Olech, L.A. Undated. Status of the flat-tailed horned lizard (*Phrynosoma mcallii*) on Bureau of Land Management administered land in California. BLM Rept., El Centro, Calif.

Olech, L.A. 1986. 1986 monitoring report: flat-tailed horned lizard relative abundance, routes Y1851 and Y1955, Yuha Basin ACEC. BLM Rept., El Centro Resource Area. 4pp.

Otis, D.L., K.P. Burnham, G.C. White, D.R. Anderson. 1978. Statistical inference from capture data on closed animal populations. Wildlife Monographs No. 62.

Parker, W.S., and E.R. Pianka. 1975. Comparative ecology of populations of the lizard *Uta stansburiana*. Copeia 1975:615-632.

Peterson, R. L. 1991. Letter from Robert L. Peterson, Entomologist-Project Leader, Curly Top Virus Control Program, Calif. Dept. of Food and Agric., Fresno, Calif. to Gavin Wright, Wildlife Biologist, BLM, El Centro. Subject: Harvester ant survey April 22-29, 1991.

Pianka, E.R., and W.S. Parker. 1975. Ecology of horned lizards: A review with special reference to *Phrynosoma platyrhinos*. Copeia 1975(1):141-162.

Piest, L. and B. Knowles. 2002. An analysis of the status and land ownership of flat-tailed horned lizard habitat in Arizona. Unpubl. AGFD Rept., Yuma, AZ.

Rado, T. 1981. Analysis of actual and potential loss of flat-tailed horned lizard (*Phrynosoma mcallii*) habitat. Rept. to Bur. of Land Mgmt., Sacramento, Calif.

Reeder, T. W., and R. R. Montanucci. 2001. Phylogenetic analysis of the horned lizards (Phrynosomatidae: *Phrynosoma*): Evidence from mitochondrial DNA and morphology. Copeia 1975(2):309-323.

Rodríguez, R. 2002. Evaluation of the status, distribution, and development of education/interpretation materials of the flat-tailed horned lizard, *Phrynosoma mcallii*

(Hallowell) in Mexico. Final Report. Centro Intercultural de Estudios de Desiertos y Océanos, A.C. Puerto Peñasco, Sonora, Mexico.

Rorabaugh, J. 1994. An analysis of scat counts as a survey method for the flat-tailed horned lizard (*Phrynosoma mcallii*). USFWS, Phoenix, Ariz.

Rorabaugh, J. 1996a. Surveys for flat-tailed horned lizard at Pinta Sands, Cabeza Prieta National Wildlife Refuge, Arizona, 3-5 May 1996. Memorandum. USFWS, Phoenix, Ariz.

Rorabaugh, J. 1996b. Surveys for the flat-tailed horned lizard, *Phyrnosoma mcallii*, at the Carrizo Impact Area, Imperial County, California. Rept. to Dept. of the Navy, Southwest Div., San Diego, Calif.

Rorabaugh, J. 1996c. Surveys for the flat-tailed horned lizard, *Phyrnosoma mcallii*, at the Salton Sea Test Base, Imperial County, California. Rept. to Dept. of the Navy, Southwest Div., San Diego, Calif.

Rorabaugh, J. 1997. Surveys for flat-tailed horned lizard at Pinta Sands, Cabeza Prieta National Wildlife Refuge, Arizona, 5-7 May 1997. Memorandum. US Fish and Wildlife Service, Phoenix, Ariz.

Rorabaugh, J., M. Coffeen, and L. Piest. 2002. Human disturbance in the Flat-tailed Horned Lizard Yuma Desert Management Area. Unpubl. report. 14pp.

Rorabaugh, J.C., C.L. Palermo, and S.C. Dunn. 1987. Distribution and relative abundance of the flat-tailed horned lizard (*Phrynosoma mcallii*) in Arizona. Southwest. Natural. 32(1):103-109.

Rorabaugh, J.C., S. Vissman, and B.L. Morrill. 2000. A multi-agency conservation agreement for the flat-tailed horned lizard in the Sonoran Desert of southwestern Arizona and southeastern California. Pages 75-76 *in* W.L. Halvorson and B.S. Gebow (eds.), Creative Cooperation in Resource Management, extended abstracts. U.S. Geological Survey, Western Ecological Research Center, Sonoran Desert Field Station, University of Ariz., Tucson.

Rosen, P.C., and C.H. Lowe. 1994. Highway mortality of snakes in the Sonoran Desert of southern Arizona. Biological Conservation 68(1994):143-148.

Ryti, R.T., and T.J. Case. 1988. Field experiments on desert ants: testing for competition between colonies. Ecology: 69:1993-2003.

Schmidt-Nielsen, K. 1964. Desert Animals: Physiological Problems of Heat and Water. 230 pp. Dover Public., Inc. N.Y.

Secretaría de Medio Ambiente y Recursos Naturales. 2002. Protección ambiental – Especies natives de México de flora y fauna silvestres – Categoriás de riesgo y especificaciones para su inclusión o cambio – Lista de especies en riesgo. Diario Oficial de la Federación, 6 de Marzo de 2002.

Setser, K. 2001. Final Report. Scientific study of the flat-tailed horned lizard, *Phrynosoma mcallii*, at OWSVRA: 2000 Field Season. California Department of Parks and Recreation, Off-Highway Motor Vehicle Division, Ocotillo Wells District.

Setser, K. and K.V. Young, 2000. Final Report. Scientific Study of the Flat-tailed Horned Lizard, Phrynosoma mcallii, at OWSVRA, 1999 Field Season. California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, Ocotillo Wells District.

Sherbrooke, W. C. 1987. Captive *Phrynosoma solare* raised without ants or hibernation. Herp Review 18:11-13.

Smith, G.R., and R.E. Ballinger. 1994. Temperature relationships in the high altitude viviparous lizard, *Sceloporus jarrovi*. Amer. Midland Nat. 131:181-189.

Smith, H.M. 1946. Handbook of Lizards: Lizards of the United States and Canada. Comstock Publishing, Ithaca, N. Y.

Stebbins, R.C. 1985. A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, Mass.

Tevis, L. 1958. Germination and growth of ephemerals induced by sprinkling a sandy desert. Ecology 39:681-688.

Tracy, C.R. 1994. Patterns of fire incidence and implications for management of desert wildlife management areas. Pp. 93-112 In Ann Fletcher-Jones (ed.), Desert Tortoise Council, Proceedings of the 1994 Symposium.

Turner, D.S., and J.C. Rorabaugh. 1998. *Phrynosoma platyrhinos* (Desert horned lizard). Predation. Herpetological Review 29(2):101.

Turner, F.B., and P.A. Medica. 1982. The distribution and abundance of the flat-tailed horned lizard (*Phrynosoma mcallii*). Copeia 1982(4):815-823.

Turner, F.B., P.A. Medica, and H.O. Hill. 1978. The status of the flat-tailed horned lizard *(Phrynosoma mcallii)* at nine sites in Imperial and Riverside Counties, California. Rept. to Bur. of Land Mgmt., El Centro, Calif.

Turner, F.B., J.C. Rorabaugh, E.C. Nelson, and M.C. Jorgensen. 1980. A survey of the occurrence and abundance of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California. Lab. of Nuclear Med. and Radiation Biol., Univ. of Calif., Riverside, Calif.

Turner, R.M., and D.E. Brown. 1982. Sonoran desert scrub. In Biotic Communities of the American Southwest-United States and Mexico. Desert Plants 4(1-4):181-221.

Twedt, B. 2001. Flat-tailed horned lizard Rangewide Management Strategy annual report; 1 July 1999 - 30 June 2001. Bureau of Land Mgmt., Yuma, Arizona.

Twedt, B. and G. Wright (eds.). 2002. Flat-tailed horned lizard Rangewide Management Strategy biannual report. Bureau of Land Mgmt. 24 pp.

U.S. Fish and Wildlife Service. 1982. Endangered and threatened wildlife and plants; review of vertebrate wildlife for listing as endangered or threatened species. Federal Register 47(521):58454-58460.

U.S. Fish and Wildlife Service. 1985. Endangered and threatened wildlife and plants; review of vertebrate wildlife; notice of review. Federal Register 50(181):37958-37967.

U.S. Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; animal notice of review. Federal Register 54(4):554-579.

U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened species, proposed rule, 50 CFR Part 17, Federal Register 58(225).

U.S. Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants: Proposed rule to list the flat-tailed horned lizard as threatened. Federal Register 58(227):62624-62629.

U.S. Fish and Wildlife Service. 1996a. Memorandum from Sam F. Spiller, USFWS, Ariz. Ecological Services Field Off., to Maj. J. D. Cox, Dir. of Range Mgmt., Marine Corps Air Stn., Yuma. April 17, 1996. Subject: Biological opinion and conference opinion for existing and proposed activities by the Marine Corps Air Station - Yuma in the Arizona portion of the Yuma Training Range Complex.

U.S. Fish and Wildlife Service. 1996b. Memorandum from Field Supervisor, Carlsbad Field Office, USFWS, to BLM State Director, California. July 9, 1996. Subject: Formal endangered species consultation/conference on renewal of the five-year pesticide use permit to the California Department of Food and Agriculture for use of malathion to control curly to virus in California. Biological Opinion No. 1-06-96-F-32.

U.S. Fish and Wildlife Service. 1997. Endangered and threatened wildlife and plants; withdrawal of the proposed rule to list the flat-tailed horned lizard as threatened. Federal Register 62(135):37852-37860.

U.S. Fish and Wildlife Service. 2001. Memorandum from Acting Field Supervisor, USFWS, Sacramento Office, to State Director, BLM, Sacramento, California. Nov. 21, 2001. Subject: Formal Section 7 Consultation on Renewal of a Five Year Pesticide Use Permit to the California Department of Food and Agriculture for use of malathion to control curly-top virus in Fresno, Kings, Kern, Los Angeles, Merced, Monterey, San Luis Obispo, San Joaquin, Santa Barbara, Stanislaus, Imperial, and Ventura Counties, California [6840(P); CA 930.6].

U.S. Fish and Wildlife Service. 2001. Endangered and threatened wildlife and plants; notice of reinstatement of the 1993 proposed listing of the flat-tailed horned lizard as a threatened species and the reopening of the comment period on the proposed rule. Federal Register 66(247):66384-66385.

U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; withdrawal of the proposed rule to list the flat-tailed horned lizard as threatened. Federal Register 68(2):331-348.

Vasek, F.C., H.B. Johnson, and G.D. Brum. 1975a. Effects of power transmission lines on vegetation of the Mojave Desert. Madrono 23(3):114-130.

Vasek, F.C., H.B. Johnson, and D.H. Eslinger. 1975b. Effects of pipeline construction on creosote bush scrub vegetation of the Mojave Desert. Madrono 23(1):1-13.

Webb, R.H., H.C. Ragland, W.H. Godwin, and D. Jenkins. 1978. Environmental effects of soil property changes with off-road vehicle use. Environ. Manage. 2(3):219-233.

Webb, R.H., and H.G. Wilshire. 1978. An annotated bibliography of the effects of off-road vehicles on the environment. Unpubl. rept. U.S. Geol. Survey Open File Rept 78-149. 28pp.

Webb, R.H., and H.G. Wilshire (Ed.) 1983. Environmental Effects of Off-Road Vehicles: Impacts and Management in Arid Regions. Springer-Verlag, N. Y.

White, G.C. and K. P. Burnham. 1999. Program MARK: Survival estimation from populations of marked animals. Bird Study 46 Supplement, 120-138. (Available online from http://www.cnr.colostate.edu/~gwhite/mark/euring.PDF)

Wilcox, B.A., and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. Amer. Naturalist 125:879-887.

Wilson, K.R., and D.R. Anderson. 1985. Evaluation of two density estimators of small mammal population size. Journal of Mammalogy 66:13-21.

Wone, B., and B. Beauchamp. 1995a. Observations on the escape behavior of the horned lizard *Phrynosoma mcallii*. Herpetological Review 26(3): 132.

Wone, B., and B. Beauchamp. 1995b. Baseline population size estimation of the horned lizard *Phyrnosoma mcallii* at Ocotillo Wells State Vehicular Recreation Area, San Diego and Imperial Counties, California. Rept. to Calif. Dept. of Parks and Rec., Off-Highway motor Veh. Div.

Wone, B., B. Beauchamp, and M. Kutilek. 1994. Development of methods for monitoring population trends of *Phrynosoma mcallii* at Ocotillo Wells State Vehicular Recreation Area, Calif. Rept. to Calif. Dept. of Parks and Rec., Contract No. C9314012. 21pp.

Wone, B., B. Beauchamp, and M. Kutilek. 1997. Annual monitoring of *Phrynosoma mcallii* at Ocotillo Wells State Vehicular Recreation Area, San Diego and Imperial Counties, California. Final Report Contract no. C9754004, California State Parks Off-Highway Motor Vehicle Division, Sacramento, Calif.

Wone, B., B. Beauchamp, E. G. Olson, and B. O. Wolf. 1991. Occurrence and distribution of the flat-tailed horned lizard, *Phrynosoma mcallii*, at Ocotillo Wells State Vehicular Recreation Area and the acquisition area, California, based upon a survey of their scats. Contract Rept. No. SG-0514 to the Calif. Dept. of Fish and Game.

Wright, G. R. 1993. Flat-tailed horned lizard status report - September 1993. BLM Rept., El Centro Resource Area, California. 59pp. + appendices and maps.

Wright, G. R. 2002. Flat-tailed horned lizard monitoring report. BLM Rept., El Centro Resource Area, Calif. 55pp.

Wright, G. and T. Grant. 2002. Mark-recapture estimates of the flat-tailed horned lizard (*Phrynosoma mcallii)* in the Yuha Basin of California. Draft report, Bureau of Land Mgmt., El Centro, Calif. 13 pp.

Young, K.V. 1999. Scientific study of the flat-tailed horned lizard, Phrynosoma mcallii, at OWSVRA: 1998 field season. California State Parks Off-Highway Motor Vehicle Division, Sacramento, Calif.

Young, K. V., and A. T. Young. 2000. Final report: scientific study of the flat-tailed horned lizard, *Phrynosoma mcallii*. U.S. Dep. of Navy Contracts N68711-95-LT-C0032, N68711-95-LT-C0035. 72 pp.

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Appendix 1. 1997 Conservation Agreement

CONSERVATION AGREEMENT
PHRYNOSOMA MCALLII, FLAT-TAILED HORNED LIZARD

1. PURPOSE AND NEED

The flat-tailed horned lizard is a small, phrynosomatid lizard inhabiting sandy flats and valleys from the Coachella Valley, California, south and east through the Borrego and Imperial valleys, California, Southwestern Yuma County, Arizona, and adjacent portions of Baja California Norte and Sonora, Mexico. Approximately 34 percent of flat-tailed horned lizard habitat has been converted to urban or agricultural uses, or was inundated by the Salton Sea early in this century and is no longer occupied by the species. Six key habitat areas remain in the United States, including the Ocotillo Wells area, Borrego Badlands, West Mesa, Yuha Desert, and East Mesa in California, and the Yuma Desert in Arizona. These areas are subject to a variety of activities that degrade habitat, including agricultural, residential, and industrial development, off-highway vehicle use, geothermal development, sand and gravel operations, military activities, fire, and construction of roads, canals, and utilities. Although population trends are difficult to monitor, evidence suggests populations may have declined in two key areas, including northern East Mesa and the Yuha Desert. The Fish and Wildlife Service proposed the flat-tailed horned lizard as a threatened species in a November 29, 1993 Federal Register Notice. Collection of the species is prohibited by state law in Arizona and California. Further information on the status, distribution, taxonomy, and threats facing this species can be found in the Rangewide Management Strategy (Appendix 1), which serves as a Conservation Assessment and Conservation Strategy.

Occupied habitat is under the jurisdiction of a variety of federal, state, local government, and private entities. The primary land owners or managers of flat-tailed horned lizard habitat in California include; the Bureau of Land Management, Department of the Navy, California Department of Parks and Recreation (Ocotillo Wells State Recreational Vehicle Area and Anza Borrego Desert State Park), Bureau of Reclamation, and private individuals. In Arizona, the primary land owners or managers are; Marine Corps Air Station Yuma, Bureau of Reclamation, Bureau of Land Management, Arizona State Land Department, and private individuals. In both states, the U.S. Border Patrol is empowered with broad law enforcement authority and conducts many activities in flat-tailed horned lizard habitat, particularly within 25 miles of the international boundary. Local governments, including cities and counties, affect location and types of development, and may affect rates of growth within their jurisdiction. The six key habitat areas are managed primarily by the parties to this agreement.

This Conservation Agreement has been initiated to conserve the flat-tailed horned lizard by reducing threats to the species, stabilizing the species' populations, and maintaining its ecosystem. The document's primary purpose is to conserve the flat-tailed horned lizard through conservation measures under the Endangered Species Act of 1973, as amended.

The Conservation Agreement establishes a general framework for cooperation and participation among signatories. The signatories will provide support to the program as needed, and will provide input on current and future program needs. The Agreement is made and entered into to meet the following objective: 1) Implement the Flat-tailed Horned Lizard Rangewide Management Strategy (Appendix 1), thus establishing an open process by which to identify and carry out such actions as will conserve the species through voluntary participation of public and private partners.

II. INVOLVED PARTIES

In order to meet the present and/or future needs of this conservation effort, this Agreement may be modified or amended at any time by mutual written concurrence of the cooperating agencies to facilitate additional cooperators. The parties below are currently involved in this agreement.

Ecological Services - Carlsbad Field Office
U.S. Fish and Wildlife Service
2730 Loker Avenue West
Carlsbad, California 92008

Ecological Services Phoenix Field Office
U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951

U.S. Bureau of Land Management
California Desert District
6221 Box Springs Boulevard
Riverside, California 92507

U. S. Bureau of Land Management
Yuma District
2555 Gila Ridge Road
Yuma, Arizona 85365

U.S. Bureau of Reclamation
Yuma Area Office
P.O. Box D
Yuma, Arizona 85356

Marine Corps Air Station - Yuma
Box 99220
Yuma, Arizona 85369-9220

U.S. Navy
El Centro Naval Air Facility
El Centro, California 92243-5001

Arizona Game and Fish Department
2221 West Greenway Road
Phoenix, Arizona 85023-4399

California Department of Fish and Game
330 Golden Shore, Suite 50
Long Beach, California 90802

California Department of Parks and Recreation
Off-Highway Motor Vehicle Division
Ocotillo Wells State Recreational Vehicle Area
P.O. Box 320
Borrego Springs, California 92004

California Department of Parks and Recreation
Anza Borrego Desert State Park
P.O. Box 299
Borrego Springs, California 92004

III. AUTHORITIES

The authorities for the involved parties to participate in this Conservation Agreement are derived from the following legislation:

U.S. FISH AND WILDLIFE SERVICE:

Endangered Species Act of 1973, as amended
Fish and Wildlife Act of 1956, as amended
Fish and Wildlife Coordination Act of 1934, as amended
Sikes Act of 1960, as amended

U.S. BUREAU OF LAND MANAGEMENT

Endangered Species Act of 1973, as amended
Federal Land Policy Management Act
Sikes Act of 1960, as amended

U.S. BUREAU OF RECLAMATION

Endangered Species Act of 1973, as amended
Fish and Wildlife Coordination Act of 1934, as amended

MARINE CORPS AIR STATION - YUMA

Endangered Species Act of 1973, as amended
Sikes Act of 1960, as amended

U. S. NAVY EL CENTRO NAVAL AIR FACILITY

Endangered Species Act of 1973, as amended
Sikes Act of 1960, as amended

ARIZONA GAME AND FISH DEPARTMENT

Arizona Revised Statute 17-231.B-7
Endangered Species Act of 1973, as amended
Sikes Act of 1960, as amended

CALIFORNIA DEPARTMENT OF FISH AND GAME

Endangered Species Act of 1973, as amended
Sikes Act of 1960, as amended
California Fish and Game Code section 1802
California Fish and Game sections 3450 et seq.

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

Endangered Species Act of 1973, as amended

In addition to the above-listed legislative authorities, the following interagency agreements provide a framework for cooperation and participation among involved parties in the conservation of species tending towards listing: a Memorandum of Understanding signed by the U.S. Fish and Wildlife Service, the U.S. Bureau of Land Management, the U.S. Forest Service, the National Park Service, the National Marine Fisheries Service, and the International Association of Fish and Wildlife Agencies, issued on January 25, 1994 and amended on March 20, 1994 (Appendix 2); and a Memorandum of Understanding signed by 14 federal agencies, including among others, the U.S. Fish and Wildlife Service, the U.S. Bureau of Land Management, U.S. Bureau of Reclamation, and Department of Defense on September 28, 1994 (Appendix 3).

IV. IMPLEMENTATION OF CONSERVATION ACTIONS

Conservation actions necessary to ensure the long-term persistence of the flat-tailed horned lizard are identified in the Flat-tailed Horned Lizard Management Plan implementation schedule. Subject to availability of funds and compliance with all applicable regulations, the involved parties agree to implement actions according to scheduled completion dates and by responsible parties, as shown in the implementation schedule. If threats have been removed to a degree that the flat-tailed horned lizard does not meet the definition of a threatened species, pursuant to the Act, the Fish and Wildlife Service may withdraw the proposed rule to list the flat-tailed horned lizard as threatened. If the species is withdrawn and it becomes known that there are threats to the survival of the species that are not or cannot be resolved through this or any Conservation Agreement, the species will be re-assigned to candidate status and an appropriate listing priority assigned.

NOW THEREFORE, in consideration of the above premises, the cooperators enter into this Agreement as full and equal partners to accomplish its purpose and objectives.

All cooperators agree to:

1 . Further develop and implement the objectives, strategies, and tasks of the Flat-tailed Horned Lizard Rangewide Management Strategy

2. As needed for this conservation effort, and as available, provide program personnel with facilities, equipment, logistical support, and access to lands under their control.

3. Participate regularly in ICC and MOG meetings to enhance communication and cooperation, and to help develop annual or other work plans and reports.

4. Develop and distribute public information and educational materials on this conservation effort.

5. Provide ongoing review of, and feedback on, this conservation effort.

6. Cooperate in development of major media releases and media projects.

7. Keep local governments, communities, the conservation community, citizens, and other interested and affected parties informed on the status of this conservation effort, and solicit their input on issues and actions of concern or interest to them.

8. Whenever possible, develop voluntary opportunities and incentives for local communities and private landowners to participate in this conservation effort.

9. Assist in generating the funds necessary to implement this conservation effort.

V. FLAT-TAILED HORNED LIZARD INTERAGENCY COORDINATING COMMITTEE

1. The involved parties shall designate a representative to serve on the Flat-tailed Horned Lizard Interagency Coordinating Committee (ICC). The ICC shall monitor the implementation of the Rangewide Management Strategy and provide a forum for exchange of information on the species. The ICC shall also be responsible for specific tasks as set forth in the implementation schedule. Through mutual agreement among designated representatives of all involved parties, the ICC may recommend changes in the tasks and scheduling of task implementation to the MOG, as described in the implementation schedule of the

Rangewide Management Strategy. The ICC shall in no way make recommendations to or serve as an advisory group to a federal agency.

Designated representatives shall attend at least two meetings of the ICC annually for the life of this Agreement to review progress and coordinate work priorities and schedules.

VI. FLAT-TAILED HORNED LIZARD MANAGEMENT OVERSIGHT GROUP

The involved parties shall designate a management-level representative to serve on the Flat-tailed Horned Lizard Management Oversight Group (FTHL MOG). The FTHL MOG will perform management-level duties, as described in the Rangewide Management Strategy and as identified by the ICC. The FTHL MOG shall meet semi-annually, or as needed. Members of the FTHL MOG have been selected by each signatory agency, and are listed below.

Bureau of Land Management, California	El Centro Resource Area Manager
Bureau of Land Management, Arizona	Yuma Field Office Manager
Bureau of Reclamation, Yuma	Yuma Area Manager
U.S. Fish and Wildlife Service, Region 1	Assistant Field Supervisor, Carlsbad
U.S. Fish and Wildlife Service, Region 2	Field Supervisor, Phoenix
Arizona Game and Fish Department	Yuma Region Supervisor
California Department of Parks and Recreation	Ocotillo Wells SVRA Superintendent
Anza Borrego Desert State Park	Superintendent
El Centro Naval Air Station	Resource Management Officer
Barry Goldwater Range	Range Management Officer
California Department of Fish and Game	Regional Manager

VII. ADMINISTRATIVE CLAUSES

1. Nothing herein shall be construed as obligating the parties to expend or as involving the parties in any contract or other obligation for the payment of money in excess of appropriations authorized by law and administratively allocated to work described herein.

2. This agreement is not a fund obligating document, and each party shall carry out its separate activities in a coordinated and mutually beneficial manner. Any activity that may create an exchange of funds will be conducted outside the scope of this agreement as authorized by law or regulations of each party.

3. All parties are hereby put on notice that the Arizona Game and Fish Department's participation in this agreement is subject to cancellation by the Governor of Arizona pursuant to A.R.S. 38-511 if any person is significantly involved in initiating, negotiating, securing, drafting, or creating a contract on behalf of the state of Arizona or any of its departments or agencies at any time while the contract or any extension of the contract is in effect, or is an employee of any other party to the contract in any capacity or a consultant to any other part of the contract with respect to the subject matter of the contract.

4. This Agreement will not be effective with respect to the Arizona Game and Fish Department until the fully executed Agreement is filed with the Arizona Secretary of State.

5. Pursuant to the laws of Arizona (A.R.S. 35-124 and 35-215, and section 41-1179.04, as amended), California, and the United States, all jointly maintained books, accounts, reports, files, and other records relating to this Agreement shall be subject at all reasonable times to inspection and audit by the state of Arizona, the state of California, and the federal government for five

years after completion of the Agreement. Such records shall be reproduced as designated by the state of Arizona, the state of California, and the federal government.

6. Any contracts entered into as a result of this Agreement shall comply with all state and federal contracting laws, including all applicable laws prohibiting discriminatory employment practices by contractors. Contracts entered into by the state of Arizona shall incorporate the Arizona Governor's Executive Order No. 75-5 entitled "Prohibition of Discrimination in State Contracts - Non-discrimination in Employment by Government Contractors and Subcontractors".

7. To the extent required or permitted by the laws of Arizona (Arizona Revised Statutes section 12-1518 and any successor statutes), California, and the United States, the cooperators agree to use arbitration, after exhausting all applicable administrative remedies, to resolve any dispute arising out of this agreement, where not in conflict with federal law or laws of the state of California. Any arbitration with respect to real property shall occur in the state where the real property is located or, if the real property is owned by the United States, shall be conducted pursuant to federal law.

IT IS MUTUALLY AGREED AND UNDERSTOOD BY AND BETWEEN THE COOPERATORS THAT:

1. Specific work projects or activities that involve transfer of funds services, or property among cooperators to this Agreement may require execution of separate agreements or contracts.

2. Specific proposed project actions or changes in management activities may require amendments to existing land use plans and further environmental analysis before implementation.

3. Conflicts between or among cooperators concerning procedures or actions under this Agreement that cannot be resolved at the operational level (i.e. by cooperator representatives to the MOG or ICC) will be referred to the next higher level within each cooperator, as necessary, for resolution.

VIII. DURATION OF AGREEMENT

The term of this Agreement shall begin on the date the Agreement is filed with the Secretary of State, after signed by all parties, and end after all tasks identified in the implementation schedule are completed, or until terminated by mutual concurrence of all the parties. The involved parties shall review the Conservation Agreement and its effectiveness annually to determine whether it should be revised. Within a year of completing the tasks identified in the implementation schedule, the Conservation Agreement shall be reviewed by the involved parties and either modified, renewed, or terminated. This Agreement may, at any time, be amended, extended, modified, supplemented, or terminated by mutual concurrence. Any party may withdraw from this Agreement by providing 60 days notice to the other parties in writing.

IX. SIGNATURES

[The original, signed signature pages are not included]

IN WITNESS WHEREOF:

The cooperators hereto have executed this Agreement as of the last written date below.

For the **U.S. DEPARTMENT OF INTERIOR, FISH AND WILDLIFE SERVICE, REGION 1**
Michael Spear, Regional Director

For the **U.S. DEPARTMENT OF INTERIOR, FISH AND WILDLIFE SERVICE, REGION 2**
Nancy Kaufman, Regional Director

For the **U.S. DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT, CALIFORNIA STATE OFFICE**
Edward Hastey, State Director

For the **U.S. DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT, ARIZONA STATE OFFICE**
Denise Meridith, State Director

For the **U.S. DEPARTMENT OF INTERIOR, BUREAU OF RECLAMATION, LOWER COLORADO REGION**
Robert Johnson, Regional Director

For the **U.S. DEPARTMENT OF DEFENSE, MARINE CORPS AIR STATION - YUMA**
C. J. Turner, Commanding Officer

For the **U.S. DEPARTMENT OF DEFENSE, EL CENTRO NAVAL AIR FACILITY**
Captain P. T. Madison, Commanding Officer

For the **ARIZONA GAME AND FISH DEPARTMENT**
Duane Shroufe, Director

For the **CALIFORNIA DEPARTMENT OF FISH AND GAME**
Jacqueline E. Schafer, Director

For the **CALIFORNIA DEPARTMENT OF PARKS AND RECREATION**
Donald Murphy, Director

Appendix 2. Federal Plans Affecting Flat-tailed Horned Lizard Habitat

Bureau of Land Management lands

In 1980, the Secretary of the Interior signed the California Desert Conservation Area Plan (BLM 1980) prescribing land uses on BLM-administered lands in California. The existing network of designated routes is illustrated on BLM's Desert Access Guides (maps). The Desert Plan established two ACECs to conserve the FTHL - the Yuha Basin (40,622 acres) and East Mesa ACECs (40,712 acres). The Desert Plan also directed that habitat management plans be written for lands adjacent to these ACECs. Although not designated specifically for the FTHL, the San Sebastian Marsh/San Felipe Creek ACEC (6,337 acres) and Dos Palmas ACEC (14,400 acres) also contain habitat for the FTHL.

In 1990, the BLM and CDFG signed the "Management Strategy for the Flat-tailed Horned Lizard on Bureau of Land Management Administered Lands within the California Desert Conservation Area" (BLM and CDFG 1990). Habitat categories were defined, and a category map was developed in the plan. A policy and formula were instituted for projects to compensate for lost or degraded habitat. Other management activities to reduce habitat degradation and loss were implemented. Measures implemented through various plans were brought into a species rangewide (California only) context. Among these were the research program, the inventory and monitoring program, interagency coordination, and habitat compensation.

California

Yuha Basin ACEC

In 1981, a combined plan was prepared for the Yuha Basin ACEC (BLM 1981). Specific actions in the plan were designed to protect sensitive cultural and wildlife resources while allowing for mineral material sales, geothermal development, and motorized vehicle competitive events. In 1983, a habitat management plan was prepared for the adjacent Yuha Desert area (BLM 1983). Measures were similar to the Yuha Basin ACEC Plan with additional measures dealing with monitoring of FTHL population trends, exchanges and acquisitions, and formation of an interagency coordinating committee. In response to indications of declining FTHL populations and increasing damage to cultural resources due to route proliferation and cross-country vehicle travel in Yuha Basin, the "Yuha Desert Management Plan" (BLM 1985) was prepared. This plan covers both of the previous areas plus several adjacent ACECs and Natural Areas. The plan tightened controls on, but did not eliminate OHV competitive events. Routes of travel were reduced in number. Camping was restricted to a 25-foot corridor along routes of travel. Law enforcement was increased. Other actions dealing with interagency coordination and monitoring of population trends were strengthened. In 1985, the Yuha Basin ACEC was expanded to 63,000 acres.

East Mesa ACEC

In 1982, the "Southern East Mesa ACEC Management Plan" (BLM 1982a) and "East Mesa Wildlife Habitat Management Plan" (BLM 1982b) were completed. The two plans covered adjacent areas and included similar measures. Although not previously conducted in East Mesa, competitive events were formally prohibited, but oil and gas leasing and geothermal energy development were allowed. The ACEC is closed to mineral material sales. Inventory and monitoring of FTHL populations were given a high priority.

San Sebastian Marsh/San Felipe Creek ACEC

In 1986, the "San Sebastian Marsh/San Felipe Creek [ACEC] Management Plan" (BLM 1986a) was signed. Based on scat counts, FTHLs are locally abundant in this ACEC (BLM 1986a). Most measures in the plan were aimed at protecting and enhancing the aquatic and riparian resources. The ACEC is closed to vehicle entry. The ACEC encompasses about 5,100 acres administered by the BLM and about 1,250 acres administered by the CDFG.

Dos Palmas ACEC

Limited FTHL habitat is found in the Dos Palmas ACEC along the northeastern side of the Salton Sea. This area encompasses about 14,400 acres of federal, state, and private lands. Dos Palmas ACEC originated in 1980 as the Salt Creek ACEC, at the time about 2,500 acres to protect Yuma clapper rail, desert pupfish, and other sensitive biological resources, including the FTHL. In 1998, BLM prepared an Ecosystem Management Plan for the ACEC and continues to implement that today.

West Mesa

The West Mesa ACEC was officially designated in 1986 to protect habitat of the FTHL, rare plants, and cultural resources. No plan has been written at this time. The ACEC encompasses more than 20,300 acres, including about 1,600 acres of private land.

Algodones Dunes

A habitat management plan for the Algodones Dunes was prepared in 1987 (BLM 1987b). Based on scat counts, FTHLs are present in small numbers, mostly around the periphery of the dunes. The plan focuses on general enhancement and protection of the flora and fauna of the dunes. Most of the dunes north of Highway 78 is designated wilderness; the dune area south of Highway 78 is open to vehicular cross-country travel.

Arizona

BLM Yuma Field Office manages approximately 900 acres of potential FTHL habitat. These 19 land parcels range in area from 1.6 to 335 acres with an average area of 46 acres. Most of the potential FTHL habitat is poor quality because parcels are typically small, fragmented, and disturbed.

BLM manages lands within the Yuma Field Office under the Yuma District Resource Management Plan (BLM 1987a) and the Lower Gila South Resource Management Plan (BLM 1998). In addition, amendments have been developed for the Yuma Resource Management Plan. They are the: Lower Gila South Resource Management Plan – Goldwater Amendment (BLM 1990), Yuma District Resource Management Plan Amendment (BLM 1992), Yuma District (Bill Williams) Resource Management Plan Amendment (BLM 1994), Yuma District (Havasu) Resource Management Plan Amendment (BLM 1994), Yuma District (Lands) Resource Management Plan Amendment, and Lechuguilla-Mohawk Habitat Management Plan (BLM 1997).

Currently, the FTHL RMS is addressed in the Lechuguilla-Mohawk Habitat Management Plan, and BLM-Yuma has been following the RMS since its inception. BLM-Yuma plans to incorporate the RMS in its upcoming resource management plan.

Department of Defense Lands

California

The Congress has withdrawn two military ranges in California, R-2510 (West Mesa) and R-2512 (East Mesa). The ranges have been withdrawn from all forms of appropriation under public land laws and are reserved for use by the Secretary of the Navy for defense-related purposes. This withdrawal became effective on October 1, 1996, and is in effect for 25 years. FTHLs occur throughout both of these ranges. Although the ranges are withdrawn from entry for non-military uses, R-2510 is adjacent to an OHV open area, and trespass OHV activity occurs. R-2512 also has some OHV use but to a lesser extent. Land management strategies and responsibilities will be developed through a new memorandum of understanding between BLM and the Department of the Navy.

Arizona

The passage of the Military Lands Withdrawal Act of 1986 (Public law 99-606) transferred land management responsibilities on the BMGR to the BLM. However in 2001, land management responsibilities transferred back to the DOD under the Military Lands Withdrawal Act of 1999 (Public law 106-65). DOD will manage the BMGR under the Integrated Natural Resources Management Plan, which is in preparation as of this writing.

On the BMGR, FTHL habitat occurs in portions of three special areas: 1) the Gran Desierto Dunes ACEC; 2) the Yuma Desert and Sand Dunes Habitat Management Area; and 3) the extreme western portion of the Tinajas Altas Mountains ACEC. In these areas, OHV use, camping, new ROWs, and other land use authorizations are limited. For safety reasons, MCAS-Yuma issues range passes for visitors to the BMGR. Visitors are restricted to driving street-legal vehicles, which further inhibits off-road travel.

For military activities on the BMGR, the USFWS has prepared a conference opinion (USFWS 1996a) that provides guidance for activities affecting the FTHL.

Bureau of Reclamation lands

About 600,000 acres, mostly in Imperial County, California, were withdrawn by Secretarial orders dating back to the early 1900's for use by the BOR in development of the All-American Canal, Boulder Canyon, Colorado River Storage, and Yuma Reclamation projects. Lands were withdrawn from settlement, sales, location under the mining laws, and entry. Withdrawn lands are managed by the BLM under an agreement with the BOR signed in 1978. The Federal Land Policy and Management Act of 1976 directed agencies holding withdrawals to work with the BLM to determine which withdrawals were obsolete and should be terminated; agency recommendations were to be submitted to the Department of the Interior for review and approval. In January 1992, recommendations reflecting the coordinated efforts of the BOR, BLM, and the Imperial and Coachella Valley Irrigation Districts were submitted to the Department of the Interior. It was recommended that 133,712 acres continue under withdrawal and that withdrawals be terminated on 444,781. The California Desert Conservation Area Plan (BLM 1980) will cover lands released from withdrawal. Unless within the boundaries of the 1964 Lower Colorado River Land Use Plan, lands continuing under withdrawal and covered under the earlier agreements will be managed by BOR.

Appendix 3. Legal Description of Management and Research Areas

Description of Yuma Desert Flat-tailed Horned Lizard Management Area

Beginning in the northwest corner of the area, the northern boundary of the MA is approximately 50 feet south of the BMGR boundary to accommodate County 14th Street and its right-of-way. On the eastern side of the MA, the boundary follows Foothills Boulevard south to the Auxiliary 2 service road. East and south along the Auxiliary 2 road to its end in Sec. 23 in T.11S., R.21W. The boundary then follows a southeasterly direction to the International Boundary. The southern boundary of the MA follows the International Boundary to Avenue D. The boundary includes federally administered lands in the Five-Mile Zone east of Avenue D and south of County 23rd Street, excluding the State Prison and the Yuma City Landfill. Along County 23rd Street and the western side of the BMGR, the boundary follows the proposed Area Service Highway route, excluding the proposed highway and its ROW.

In the interim period until a full analysis of alternative corridors is completed, federally administered lands within the BMGR west of the proposed route of the Area Service Highway and in the Five-Mile Zone north of the proposed route will be managed in accordance with prescriptions that apply to MAS.

QUAD SHEETS:

East boundary – Butler Mountains, Vopoki Ridge SE, Vopoki Ridge, W. of Vopoki Ridge, Fortuna SW, Fortuna

North boundary – Fortuna, Yuma East

West boundary – Yuma East, Yuma SE, S.E. of Somerton, S. of Somerton

South boundary – S. of Somerton, S.E. of Somerton, W. of Vopoki Ridge, Vopoki Ridge SW, Vopoki Ridge SE, Butler Mountains

Description of East Mesa Flat-tailed Horned Lizard Management Area

All are San Bernardino Meridian.

[East boundary] Beginning in Sec. 31 in T.16S., R.20E. at the intersection of Frontage Road and West Levee Road on the north side of the All-American Canal, then northwest along the West Levee Road (on west levee of Coachella Canal) to Highway 78 (Glamis Highway) in Sec. 35 in T.13S., R.17E;

[North boundary] then west on Highway 78 to the intersection with an unnamed dirt road in NW¼NE¼NE¼ Sec. 2 in T.14S., R.16E.;

[West boundary] then south on this dirt road to the intersection with BLM Route A181 in Sec. 23 in T.14S., R.16E., then south on BLM Route A181 to BLM Route A3410 in Sec. 11 in T.15S., R.16E., then eastward and southward on BLM Route A3410 to BLM Route A357 in Sec. 18 in T.15S., R.17E, then east on BLM Route A357 for about 0.3 miles to the west side of Sec. 17 in T.15S., R.17E., then south on the west side of Sec. 17, 20, 29, 32 in T.15S., R.17E. and Sec. 5, 8, and 17 in T.16S., R.17E to the Frontage Road on the north side of Interstate Highway 8 in Sec. 17 in T.16S., R.17E.;

[South boundary] then east on Interstate 8 Frontage Road to the west side of E½E½ Sec. 31 in T.16S., R.19E., then due north to the northern side of Sec. 31, then east 1.0 miles to the west side of E½E½ Sec. 32 in T.16S., R.19E., then due south to the Frontage Road, then east to the west side of Sec. 36 in T.16S., R.19E., then north to the N½ Sec. 36, then due east 1 mile to the east side of Sec. 36, then south to Frontage Road, then east on Frontage Road to the West Levee Road.

QUAD SHEETS:

East boundary - Grays Well, Cactus, Glamis SE, Glamis SW, Glamis NW.

North boundary - Glamis NW, Holtville NE.

West boundary - Holtville NE, Holtville East, Glamis SW.

South boundary - Glamis SW, Midway Well NW, Midway Well, Grays Well.

Description of West Mesa Flat-tailed Horned Lizard Management Area

All are San Bernardino Meridian.

[East boundary] Beginning in southeast corner of Sec. 30 in T.14S., R.13E. and north along the east side of Sec. 30, 19, 18, and 7 to the south side of N½ of Sec. 7, then west and north around SW¼NE¼ Sec. 7, then west and north around NW¼NE¼ Sec. 7, then west along the north side of N½ Sec. 7, then north about 0.15 miles along the east side of Sec. 13 in T.14S., R.12E. to the southeast corner of Sec. 12, then in Sec. 12, west and north around E½SE¼, then west and north and east around SW¼NE¼, then north along the west side of NE¼NE¼, then in Sec. 1 in T.15S, R.12E., north along the west side of SW¼SW¼, then west and north around NW¼SE¼, then west and north around E½NW¼, then west to the southeast corner of Sec. 35 in T.13S., R.12E., then north along the west side of Sec. 35 to the northeast corner of Sec. 35, then west and north around E½ of Sec. 26, then west along the northern side of Sec. 26 W½, 27, and 28 to the intersection with BLM Route SF291 (transmission power line service road), then northwest on BLM Route SF291 to the northern side of Sec. 28 in T.12S., R.11E., then west on the north side of Sec. 28 to the southeast corner of Sec. 20, then north on the east side of Sec. 20 to Highway 86, then northwest on Highway 86 to the northern side of Sec. 20, then west on the northern side of Sec. 20 to the southeast corner of Sec. 18 in T.12S., R.11E., then north along the east side of Sec. 18 to Highway 78;

[North boundary] then west on Highway 78 to the west side of Sec. 18 in T.12S., R.10E.;

[West boundary] then south on the west side of Sec. 18 in T.12S., R.10E., then west on the north side of Sec. 24 in T.12S., R.9E. to the west side of Tarantula Wash, then southeast along the west side of Tarantula Wash to the south side of Sec. 24, then east to the northwest corner of Sec. 30 in T.12S., R.10E., then south along the west side of Sec. 30 and east along the south side of Sec. 30, then south on the west side of Sec. 32 and east along the south side of Sec. 32 to Carrizo Wash near the northeast corner of Sec. 5 in T.13S., R.10E., then south along the west side of Carrizo Wash through Sec. 5, 8, 17, 20, 29, and 32 in T.13S., R.10E., and then south through Sec. 5, 8, 17, 20, 29, and 32 in T.14S., R.10E. to the intersection with BLM Route SF397 in NW¼ Sec. 32 in T.14S., R.10E., then southeast on BLM Route SF397 to an unnamed, east-west route along the northern side of the SW¼SE¼ Sec. 15 in T.15S, R.10E., then west about .25 miles to the boundary of the U.S. Navy Target 103 at about the northwest corner of SE¼SE¼ Sec. 15, then south along the boundary of Target 103 (approximately west side of SE¼SE¼ Sec. 15 and E½E½ Sec. 22 to the south side of Sec. 22 in T.15S, R.10E.,

[South boundary] then (along the boundary of Target 103) east on the south side of Sec. 22 and east and south around NW¼ of Sec. 26 in T.15S, R.10E., then east along the south side of NE¼ of Sec. 26 and N½ Sec. 25, in T.15S., R.10E., and N½ Sec. 30 and NW¼ Sec. 19, in T.15S., R.11E., then north along the east side of NW¼ Sec. 19, then north and east around the S½SW¼ Sec. 20, then north along the east side of Sec. 20 and 17, then east along the south side of Sec. 9, then north along the east side of Sec. 9, then east along the north side of Sec. 10, then north along the east side of Sec. 3, in T.15S., R.11E and along the east side of Sec. 34 and 27 in T.14S., R.11E, then diagonally from the southeast corner to the northwest corner across Sec. 22, the west along the north side of Sec. 21, then north on the east side of Sec. 17 to the 120-ft. contour line, then northwest on this contour line to the intersection with BLM Route SF274 in Sec. 17 T.14S., R.11E., then northwest on BLM Route SF274 to the intersection with BLM Route SF391 in Sec. 6 T.14S., R.11E., then southwest on BLM Route SF391 to the boundary of U.S. Navy Target 101 in Sec. 32 T.14S., R.12E., then southeast along the boundary of Target 101 to the southwest corner of Sec. 34 in T.14S., R.12E., then west on the south side of Sec. 34, 35, and 36 in T.14S., R.12E., then south along the west side of Sec. 30 in T.14S., R. 13E., then along the south side of Sec. 30 to the southeast corner of Sec. 30.

QUAD SHEETS:

East boundary - Brawley NW, Calipatria SW, Kane Spring, Kane Spring NE.

North boundary - Kane Spring NE, Kane Spring NW.

West boundary - Kane Spring NW, Harpers Well, Plaster City NW, Painted Gorge.

South boundary - Painted Gorge, Plaster City, Superstition Mountain, Brawley NW.

Description of Yuha Desert Flat-tailed Horned Lizard Management Area

All are San Bernardino Meridian.

[East boundary] Beginning at the International Boundary Road on the east side of Sec. 19 in T.17S., R.13E., then north along the eastern edge of public lands lying west of the Westside Main Canal Service Road in T.17S., R.13E.; T.17S., R.12E.; and T.16½S., R.12E. to Interstate Highway 8;

[North boundary] then east along the south side of Interstate Highway 8 to the west side of Sec. 30 in T.16S., R.11E.;

[West boundary] then south along the west side of Sec. 30 and 31 (T.16S., R.11E.) about 1.5 miles to the intersection with BLM Route Y1929, then south on BLM Route Y1929 to BLM Route 2716 in Sec. 12 in T.17S, R.10E., then south on BLM Route Y2716, to BLM Route Y2722 in Sec. 11 in T.17S, R.10E., then south to the International Boundary Road;

[South boundary] then east along the International Boundary Road to the east side of Sec. 19 in T.17S., R.13E.

QUAD SHEETS:

East boundary - Mount Signal, Yuha Basin, Plaster City.

North boundary - Plaster City, Painted Gorge.

West boundary - Painted Gorge, Coyote Wells.

South boundary - Coyote Wells, Yuha Basin, Mount Signal.

Description of Borrego Badlands Flat-tailed Horned Lizard Management Area

All are San Bernardino Meridian.

[East boundary] Beginning at the road near the northeast corner of the SE¼ of Sec. 32 (unsurveyed) in T.11S., R.8E., then north along the east side of Sec. 32, 29, 20, and 17 (unsurveyed), then east on the south side of Sec. 9 and 10 in T.11S., R.8E. to the east side of the east fork of Palo Verde Wash in Sec. 10, then northwest and north along the east side of Palo Verde Wash to Borrego Springs Highway, then northwest along Borrego Springs Highway to the intersection with Truckhaven Trail in NE¼SW¼ Sec. 13 in T.10S., R.7E., then west on Truckhaven Trail to the 800-ft. contour line in NE¼NW¼ Sec. 14, then north and northwest along the 800-ft. contour line through Sec. 14, 11, 12, 1, and 2 in T.10S, R7E and Sec. 35, 34, 27, 28, 21, and 20 in T.9S., R.7E. to the northern side of Sec. 20 in T.9S., R.7E;

[North boundary] then west along the northern side of Sec. 20 and 19 in T.9S., R.7E. and the northern side of Sec. 24 and 23 in T.9S., R.6E. to the northwest corner of Sec. 23;

[West boundary] then south on the west side of Sec. 23 in T.9S., R.6E. to the intersection with the Rockhouse Trail in ¼SW¼NW Sec. 23, then southeast on Rockhouse Trail (west fork in Sec. 36, 1, 6, 7) through Sec. 23, 26, 25, and 36 in T.9S., R.6E. and Sec. 1 in T.10S., R.6E. and Sec. 6 and 7 in T.10S., R.7E. to the northwest corner of Sec. 17 in T.10S., R.7E., then east along the northern side of Sec. 17, then south along the eastern side of Sec. 16, 21, 28, and 33 in Sec. T.10S., R.7E. and the eastern side of Sec. 4, 9, 16, and NW¼ Sec. 21 in T.11S., R.7E. to the southwest corner of NW¼ Sec. 16;

[South boundary] then west on the south side of NW¼ of Sec. 21 then south on the south side of E½ Sec. 21, then east on the south side of Sec. 21, 22, and 23 to the Borrego Mountain Wash Jeep Trail in Sec. 23 in T.11S., R.7E., then north along the Borrego Mountain Wash Jeep Trail to the intersection with the San Felipe Creek Road in SW¼SE¼ Sec. 14, then west along the San Felipe Creek Road to the east side of Sec. 32 (unsurveyed) in T.11S., R.8E.

QUAD SHEETS:

East boundary - Borrego Mountain, Fonts Point, Clark Lake, Clark Lake NE.

North boundary - Clark Lake NE.

West boundary - Clark Lake NE, Clark Lake, Borrego Sink

South boundary - Borrego Sink, Borrego Mountain

Description of Ocotillo Wells Flat-tailed Horned Lizard Research Area

All are San Bernardino Meridian.

East boundary Beginning at the intersection of Highway 86 and Highway 78 in Sec. 17 in T.12S, R.11E., then north along Highway 86 to the north side of Sec. 9 in T.11S., R.10E.;

North boundary then west on the northern side of Sec. 9, 8, and 7 in T.11S., R.10E., then north on the east side of Sec. 1 in T.11S., R.9E to the intersection with the northern fork of Arroyo Salada Wash in ¼NE¼NE¼NE of Sec. 1., then northwest along this wash through Sec. 36 in T.10S., R.9E. and east through N½N½ Sec. 35 and 34 to the intersection with Truckhaven Trail in NE¼NE¼, then west on Truckhaven Trail to the west side of Sec. 30 (Imperial/San Diego County Line);

West boundary then south on the west side Sec. 30 and 31 in T.10S., R.9E. and the west side of Sec. 6 and 7 in T.11S., R.9E to a point about 0.6 miles south of the northwest corner of Sec. 7, then due west 4 miles, then due south along the west side of Sec. 16, 21, 28, and 33 in T.11S., R.8E. and the west side of Sec. 4 in T.12S., R.8E. to Highway 78;

South boundary then east on Highway 78 to the intersection with Highway 86.

QUAD SHEETS:

East boundary - Kane Spring NE, Kane Spring NW.

North boundary - Kane Spring NW, Truckhaven, Seventeen Palms.

West boundary - Seventeen Palms, Shell Reef, Borrego Mountain.

South boundary - Borrego Mountain, Kane Spring NW, Kane Spring NE.

Appendix 4. Population Monitoring Protocol

Introduction

This protocol describes how to establish and survey 12 plots on a MA and is based on Wright and Grant's (2002) surveys of the Yuha Desert MA.

Plot selection

The MA can be stratified based on coarse habitat differences (three strata were defined based on substrate in the Yuha Desert MA). The 12 plots should be divided between strata. Plots should be randomly selected from within the strata. Each plot should measure 200 x 200 m (4 ha; 10 acres). Divide the plot into 20, 10 m-wide north/south lanes using pin flags (this takes 400 pin flags and about a day of work).

Disturbance surveying

Data on substrate and disturbance should be collected for each plot in a separate procedure (usually after flagging the plot on the first day). Each of the three technicians walks the flag lines (one beginning at each end and one beginning in the middle), and records the substrate and disturbance category at the tip of his/her toe on every tenth step until each technician has recorded 100 point observations (see data sheet in Appendix 8). A vehicle track is recorded if the point was in a vehicle track of any kind of any age. Two digital photos should also be taken at each plot, from the middle of the north and south sides, facing into the plot.

Lizard surveying

All surveys shall be conducted from April through September when air temperatures are between 25 and 37 °C (75 and 100 °F) (Young and Young 2000). Each plot is to be surveyed by three technicians looking for lizards while walking side by side in each lane, taking care to search the whole plot thoroughly. Technicians should begin searching 20 minutes before sunrise. The entire plot should be searched in a morning before temperatures get too hot for the lizards to be on the surface (it generally takes three people two to four hours per plot). Each plot should be surveyed for five consecutive days.

When a FTHL is found, all data on the Horned Lizard Observation Data Sheet (see Appendix 8) should be filled in completely. Additional data to be collected while walking the plot includes number of horned lizard scat seen and other lizard species observed.

To minimize survey variance, always use the same number of people each day on a plot and use the same people on a plot for all survey days. Try to search for the same amount of time each day, and only search all areas and lanes of the plot once a day, giving equal effort to each area of the plot. Rotate where you start the plot each day from one side to the other and then from the center in either direction, thus ensuring that each portion of the plot is searched under the ideal temperature regime.

Data analysis

Capture histories are to be analyzed using the computer program MARK (Otis *et al.* 1978; White and Burnham 1999), which gives an estimate of the population using the plot. Population estimates for adults and juveniles (<60 mm SVL) should be obtained separately. The most

appropriate model, as determined by MARK's model selection procedure (using Akaike's Criterion and M(0) as a baseline), should be used for abundance estimates, although models determined to have unrealistic assumptions (i.e., regarding individual capture heterogeneity, capture response, or temporal variability) may be disregarded. The population calculated by MARK can't simply be divided by 4 ha to get a density estimate (Otis *et al.* 1978). More lizards use the plot over time than are on the plot at any single time. Many home ranges are only partially in the plot. To calculate density, the mean maximum distance moved (MMDM) method of Wilson and Anderson (1985) should be used. This method adds a boundary strip around the plot using the observed recapture distances during the survey as an index of home range size for that site/year. This method is more appropriate than using a set boundary based on home range averages because FTHL home range size varies according to habitat, gender, size, density of lizards, how wet the year is and how long you follow the lizard (Young and Young 2000; Setser 2001; Young, pers. obs.; Kirk Setser, pers. comm.).

Appendix 5. Distribution Monitoring Protocol

Distribution shall be monitored through one-hour presence/absence surveys at one-hectare (100 x 100 m) [2.5 acre (330 x 330 ft.)] sample points. All surveys shall be conducted from April through September when air temperatures are between 25 and 37 °C (75 and 100 °F) (Young and Young 2000). Surveys should be conducted by personnel who have demonstrated competence at locating FTHLs. The distribution monitoring datasheet in Appendix 8 should be used for data collection. Each sample point should be surveyed by only one person, but it is recommended that researchers work in pairs (drive together to the general area and split up to survey nearby sample points).

Key Areas

Within each MA, two permanent key areas will be selected for long-term monitoring. These key areas will serve as an early warning system where localized population declines can be detected before becoming widespread. Hence, key areas should be selected in areas of known or suspected habitat decline, most likely on the margins of the MA. Key areas can be of any shape, but should be four square miles (10.4 km^2) in total area. A control area, also four square miles, should be selected in the interior of the MA away from disturbances, to serve as a control against which changes in distribution within key areas can be compared. Within each area, 30 permanent one-hectare sample points should be randomly selected. Thirty additional sample points should be randomly selected from outside the control and key areas. These last 30 points are for refining the predictive distribution model over time and should not be permanent. Choose all sample points ahead of time and assign an identifying number to each. Vary which area you sample from week to week to avoid a seasonal bias. Sample each point only once each year. In subsequent years, resample the permanent points in the control and key areas, but select new random points for model refinement.

Monitoring Protocol at Sample Points

To survey, navigate to a sample point with a GPS unit, put down a tall pin flag to mark the position (the center of the hectare), note the starting time, then take a digital photo from the middle point, facing whichever direction you feel best represents the average habitat of that hectare. Spend up to one hour searching carefully within a 50-meter radius of the flag. Measure disturbance and other variables of interest during your initial search by collecting 50 “toe point” samples. This is done by walking north/south transects spaced 10-20 m apart and recording whether there is a vehicle track (of any size or age) or other variable of interest (e.g. galleta grass) within two m (6.5 ft) of every 10th footstep (if you encounter a horned lizard track while doing toe point samples, pause the sampling and follow the track—you can finish your sampling later). If you encountered a FTHL while measuring disturbance, no additional searching is needed. If you did not encounter a FTHL, continue surveying in any fashion that gives good coverage of the hectare and maximizes the chance of encountering a FTHL (tracking is encouraged when conditions allow). Note presence of scat, but focus on finding a lizard. The survey ends after one hour, or as soon as a FTHL is found and disturbance data have been gathered. Note end time, check that all data are filled out and then (if conditions permit) navigate to the next sample point (with a goal of completing two or three samples per person each morning).

Data analysis

The presence or absence of FTHLs (represented as a 1 or 0 respectively) at each location serves as the dependent variable to be used in conjunction with GIS overlays that represent various habitat features (the independent variables) in a logistic regression model. Using a recently developed ArcView extension, StatMod (Garrard, 2002), the goal is to create a predictive spatial model of FTHL occurrence within the MA and surrounding area. Such a model predicts probability of presence, and should indicate areas of high and low importance to the lizard. Proximity to roads and agriculture, as well as disturbance from OHV activity (if available as GIS overlays) can also be used as predictor variables, thus allowing assessment of their effects upon FTHL occurrence.

StatMod samples the independent variables at each survey point, and the resulting data set is used to create the model. The user has great flexibility in model creation (e.g. selecting which independent variables will be used in the model through either backward elimination, forward selection, stepwise selection, no selection, or specifying certain variables that must be included). Careful thought should be given to the choice of independent variables and to the settings for model parameters. Either categorical or continuous predictor variables may be used. It is recommended that Chris Garrard (Utah State University), or another statistician familiar with spatial modeling, be consulted prior to undertaking any analyses. The StatMod extension and a user's guide are available (at no cost) at http://bioweb.usu.edu/gistools/statmod/ but to run the logistic regression model requires ArcView 3.2 and SAS statistical software. The model can be refined as additional survey data are collected.

Appendix 6. Project Evaluation Protocol

Introduction

The objective of this protocol is to provide an assessment of FTHL presence or absence at proposed project sites within FTHL habitat on federal lands outside of MAs, to determine whether mitigation may be required (mitigation and compensation are automatically required on MAs, and compensation is required on all historic FTHL habitat on signatory lands outside of MAs). If the results indicate the species is present in a proposed project area, that project will be subject to appropriate mitigation and compensation. Surveys to determine presence or absence of the species are only required in areas of unknown occurrence (mitigation and compensation are automatically required in areas of known occurrence). However, a project proponent can forego these surveys by assuming the species is present and applying appropriate mitigation and compensation. If less than 20 acres of continuous potential habitat remain on and adjacent to the project site, no surveys or mitigation will be required (but compensation will still be required).

Areas of Known Occurrence

Resource and land management agencies have mapped areas of known FTHL occurrence (Figure 2). Within the historical range, assume the species is present if:

1. There is a locality record within two miles; and
2. the habitat is continuous (i.e., not divided by impermeable barriers such as a canal) and suitable between the locality and the project site; and
3. major habitat alteration or conversion has not taken place since the species was detected.

Areas of Unknown Occurrence

In areas of potentially suitable habitat within or on the edge of the species' range (Figure 2) in which presence is not assumed, surveys must be conducted to determine the presence or absence of FTHLs at project sites prior to project initiation. If the surveys indicate FTHLs are present at the project site, then mitigation and compensation will be required. If all survey requirements are met and the species is deemed absent, then mitigation is not required.

Required Authorizations and Qualifications

Only persons authorized by AGFD (in Arizona) or CDFG (in California) shall conduct surveys and handle FTHLs. Investigators shall have experience in surveying for FTHLs, including ability to recognize and follow FTHL tracks, or shall obtain training from an experienced investigator. Prior to any survey effort, a survey proposal shall be developed and approved by AGFD (in Arizona), CDFG (in California), and/or by the state or federal agency that manages the lands to be surveyed.

Survey Protocol

Although investigators shall focus on finding horned lizards, both scat and horned lizards shall be noted. All surveys shall be conducted from April through September when air temperatures are between 25 and 37 ^{o}C (75 and 100 ^{o}F) (Young and Young 2000). For projects that will impact less than nine hectares (22 acres), surveys should cover an area of at least nine hectares, centered on the proposed project site (unless one or more edges of the project site are unsuitable habitat, in

which case the surveys would be conducted in adjacent suitable habitat). A minimum of four one-hour presence/absence surveys (Appendix 5) shall be conducted in this area, with one of the surveys centered on the project site.

For larger projects the number of one-hour presence/absence surveys will increase in the following manner:

Project impact size (ha)	Number of one-hour presence/absence surveys
10-25	4
26-50	6
51-100	8
100-260 (1 section)	10
> 260	10 per section

Road Surveys

FTHLS are often easier to detect on roadways than during walking surveys. Thus, road surveys shall also be conducted and shall consist of driving all roads at least twice in or near the survey area and recording any horned lizards observed. Workers should drive very slowly (no more than 10 miles per hour on unpaved roads) to allow detection of lizards. Road surveys should be conducted from April through September primarily in the morning when air temperatures range from 25 to 37 ^{o}C (Young and Young 2000).

Data Records

The location of transects, and each FTHL, desert horned lizard, and horned lizard scat found during walking or road surveys shall be recorded on maps of scale no less than 1:24,000. Date and time observed, and (if captured) sex and snout-vent length shall be recorded for each horned lizard observed. A 35-mm color photograph with the lizard filling at least half of the frame shall be taken of each horned lizard. A sample of horned lizard scat shall be collected. A qualitative assessment of the habitat should be conducted, including listing dominant perennial and annual plants, substrate types, and level of disturbance (note roads, OHV tracks, vegetation removal, etc.) Photographs can be used to document habitat characteristics. Survey dates, and beginning and ending times and surface temperatures of each survey shall be recorded. Any blocks of time not actually spent conducting the survey shall be subtracted from the total survey time. Data collected during walking surveys shall be recorded on the attached sample survey form. Survey results shall be detailed in a report to which all survey forms and data on lizards, including photographs and maps, shall be appended.

Interpretation of Survey Results

The following criteria shall be used to derive presence or absence of the FTHL from the survey results:

Species present if:

1. FTHLs are found; or
2. Horned lizard scat is found and the desert horned lizard is unlikely to occur at the project site; or, as noted previously,
3. No FTHLs are found; but
    a) FTHLs have been found within two miles of the project site, and
    b) The habitat is continuous or suitable between the locality and the project site.

Species absent if:

1. No scat or horned lizards are found; and
    a) No FTHLs have been found within two miles of the project site; or
    b) FTHL locality record(s) exist within two miles, but the habitat is not continuous or suitable between the locality and project site; or
2. Scat is found, no FTHLs are found, but desert horned lizards occur within two miles of the project site; and
    a) No FTHL locality record(s) exist within two miles of the project site; or
    b) FTHL locality record(s) exist within two miles, but the habitat is not continuous or suitable between the locality and project site.

If, based on the above analysis, FTHLs are deemed present, locality records, scat occurrence, and descriptions of habitat shall be sent to the ICC secretary to update the distribution map.

Appendix 7. Fencing and Removal Survey Protocols

In accordance with Measure 8 of the Mitigation section, sites of permanent or long-term (greater than one year) projects in MAs where continuing activities are planned and where FTHL mortality could occur may be enclosed with FTHL barrier fencing. After clearing the enclosed area of horned lizards following the protocol described in this appendix, no on-site monitor is required (see Measure 7 of the Mitigation section). Fencing for the purpose of producing a FTHL barrier along roads (see Mitigation Measure 10) shall also follow these protocols as applicable. Prior to any fencing or removal survey, a proposal shall be developed and approved by AGFD (in Arizona), CDFG (in California), and/or by the state or federal agency that manages the lands to be surveyed.

Fencing Protocol

Barrier fences for the exclusion of FTHLs shall follow these specifications:

1) The barrier fence shall be constructed along the entire perimeter of the project and be inset sufficiently from the perimeter of the parcel to allow for construction and maintenance.
2) Barrier material shall be 0.25” mesh hardware cloth and 36” in height
3) Barrier material shall be buried 6” deep, providing 30” above the surface.
4) Barrier material shall be securely attached to t-posts or fence posts and barbed wire strung at heights of 15” and 30” (A third barbed wire shall be strung above the FTHL proof fencing), using metal clips or wire.
5) Additional t-posts or fence posts shall be placed at any junctions between rolls of hardware cloth to discourage the formation of gaps.
6) An experienced biological monitor shall oversee the construction of the barrier fence and be on-site to search for and remove FTHLs during surface-disturbing activities.
7) The entire fence shall be maintained in perpetuity, including but not limited to the repair of gaps under or in the fence, and accumulation of plant debris or sand on the outside of the fence.
8) Biological monitors shall conduct a removal survey, following the protocol below, only after the fence construction is completed.

Removal Survey Protocol

Removal surveys shall be conducted after barrier fence completion and prior to construction activities. Surveys shall follow these guidelines:

1) Surveys shall be conducted by experienced biological monitors as described in Appendix 6.
2) Surveys shall occur only during appropriate survey conditions as described in Appendix 6
3) Projects < 4 acres (1.6 ha) in size require four hours of survey effort. For larger projects, minimum survey effort shall be 0.5 hour per acre. The land managing agency may require a greater survey effort.

4) Survey methods shall be designed to achieve a maximal capture rate and shall include but not be limited to the following: strip transects, tracking, and raking around shrubs.

5) Survey methods shall incorporate a systematic component to ensure that the entire fenced project site is surveyed. A modification of the Population Monitoring Protocol (Appendix 7) may be used.

Appendix 8. Forms and Data Sheets

Population Monitoring Data Sheet……108
Distribution Monitoring Data Sheet……109
Horned Lizard Observation Data Sheet……110
Project Reporting Form ……111

Population Monitoring Data Sheet

MA: _____ Plot#: ____ Technicians: _____

Corner locations (NAD 27 projection, UTM Zone _____) NW _____ , _____SW _____, _____

NE _____ , _____ SE _____ , _____ Photo ID #'s _____ ,_____ Dominant Vegetation _____

Habitat Inventory (report totals from 300 point obs here): OHV trails _ Fine sand (< 0.5 mm):_____Coarse sand (0.5 – 1.0 mm):_____Gravel (> 1 – 30 mm):____ Rock (> 30 mm): ___

5 DAY CAPTURE HISTORY TABLE

	DAY 1		DAY 2		DAY 3		DAY 4		DAY 5		Start Date:
Start/End times											
Start/End temps											**End Date:**
Start corner											

Record UTM (NAD 27) of capture for each day caught (or mark '0' if not seen). Record full capture data of each lizard's initial capture on the Horned Lizard Observation data sheet

ID	SEX[1]	AGE[2]	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	CAP. HIST.[3]
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15[4]								

[1]Sex categories: 0 = female, 1 = male. [2]Age categories: 0 = hatchling = < 40 mm; 1 = juvenile = 40-60 mm; 2 = adult = > 60 mm. [3]Series of five 0's and 1's where 1 = caught, 0 = not seen. Compile capture histories for each animal at the end of the 5 survey days. [4]If more than 15 individuals are captured on a plot, use an additional data sheet.

Distribution Monitoring Data Sheet

Sheet #_____

(Time should be recorded in 24:00 clock)

Use NAD27 projection and **specify UTM Zone_____**

Observer	Date	Start time	End time	Easting (UTM)	Northing (UTM)	Plot #	Photo #

NOTES:

FTHL	DHL	Scat	GrSq	Ztail	<500 m from development?	Disturbance	Ggrass
Record these as 1 = present; 0 = absent. Record FTHL measurements on FTHL observation data sheet.					If yes, specify type (road, ag, housing)	Values between 0 and 50 from toe-point samples	

Observer	Date	Start time	End time	Easting (UTM)	Northing (UTM)	Plot #	Photo #

NOTES:

FTHL	DHL	Scat	GrSq	Ztail	<500 m from development?	Disturbance	Ggrass
Record these as 1 = present; 0 = absent. Record FTHL measurements on FTHL observation data sheet.					If yes, specify type (road, ag, housing)	Values between 0 and 50 from toe-point samples	

Observer	Date	Start time	End time	Easting (UTM)	Northing (UTM)	Plot #	Photo #

NOTES:

FTHL	DHL	Scat	GrSq	Ztail	<500 m from development?	Disturbance	Ggrass
Record these as 1 = present; 0 = absent. Record FTHL measurements on FTHL observation data sheet.					If yes, specify type (road, ag, housing)	Values between 0 and 50 from toe-point samples	

Horned Lizard Observation Data Sheet

Sheet #_____

(Time should be recorded in 24:00 clock)

Use NAD27 projection and **specify UTM Zone_____**

Observer	**Date**	**Time**	**Easting (UTM)**	**Northing (UTM)**	**Plot #**	**I.D. #**	**Photo #**

Species		**Sex**		SVL **(mm)**	**Weight (g)**	**Notes:**
FTHL	DHL	M	F			

Observer	**Date**	**Time**	**Easting (UTM)**	**Northing (UTM)**	**Plot #**	**I.D. #**	**Photo #**

Species		**Sex**		SVL **(mm)**	**Weight (g)**	**Notes:**
FTHL	DHL	M	F			

Observer	**Date**	**Time**	**Easting (UTM)**	**Northing (UTM)**	**Plot #**	**I.D. #**	**Photo #**

Species		**Sex**		SVL **(mm)**	**Weight (g)**	**Notes:**
FTHL	DHL	M	F			

Observer	**Date**	**Time**	**Easting (UTM)**	**Northing (UTM)**	**Plot #**	**I.D. #**	**Photo #**

Species		**Sex**		SVL **(mm)**	**Weight (g)**	**Notes:**
FTHL	DHL	M	F			

Observer	**Date**	**Time**	**Easting (UTM)**	**Northing (UTM)**	**Plot #**	**I.D. #**	**Photo #**

Species		**Sex**		SVL **(mm)**	**Weight (g)**	**Notes:**
FTHL	DHL	M	F			

Observer	**Date**	**Time**	**Easting (UTM)**	**Northing (UTM)**	**Plot #**	**I.D. #**	**Photo #**

Species		**Sex**		SVL **(mm)**	**Weight (g)**	**Notes:**
FTHL	DHL	M	F			

Observer	**Date**	**Time**	**Easting (UTM)**	**Northing (UTM)**	**Plot #**	**I.D. #**	**Photo #**

Species		**Sex**		SVL **(mm)**	**Weight (g)**	**Notes:**
FTHL	DHL	M	F			

Project Reporting Form

for Projects or Activities that Disturb Flat-tailed Horned Lizard Habitat

*This form is to be filled out before project initiation **and** after project completion.*

If this form is used for reporting unauthorized disturbances (within or outside of MAs*), document all information sources, preferably with publicly available documents. In all cases, respect private property rights.*

PROJECT DESCRIPTION/LOCATION:
Project Number:_____Authorizing Agency:_____Field Contact Rep:_____
Project name/description:_____
Project proponent:_____ Authorized:___ Unauthorized:___

Project type: Construction___ Military Maneuver___ Land Disposal___ Maintenance of Existing Project___ Intrusive Research___ Recreation/Interpretive Development___ Mining (includes sand and gravel)___
Other (describe)_____

Project location: (attach map showing location and footprint of project)
Within MA___ (indicate which MA)_____
Outside MA___Township_____ Range_____ Section_____ 1/4 Section_____

EFFECTS OF THE PROJECT:
Growth inducing effects: Yes___ No___ **Previously disturbed:** Yes___ No___ Partly___
Duration of effect: Short term (<10 yrs)___ Long term (≥10 yrs)___ **New access:** Yes___ No___
Acres lost as habitat:_____ Acres degraded:_____
Lands outside project footprint: Not affected_____ Adversely affected_____

MITIGATION/COMPENSATION:
Mitigation required: Yes___ No___ **Mitigation plan:** Yes___ No___ **Mitigation type:** Construction limited to 11/15-2/15___ Worker education___ Location altered___ FCR___ Define and limit work areas___ Biological monitor___ Preconstruction surveys___ Perimeter lizard fence___ Restoration___ Post-project monitoring___Other_____
_____

Compensation required: Yes___ No___ **Compensation type:** $(amount)_____ Lands(acres):_____
If compensation is lands: Lands transferred to:_____
Location of lands:_____

FTHL ***OBSERVATIONS***:
FTHL Observed on Project Site: Yes___ No___ **If Yes, fill out the FTHL Observation Data Sheet**
#FTHLs relocated_____ #FTHLs killed_____ #FTHLs injured_____

COMMENTS:_____(continue other side if needed)

Preparer (print):_____ Title:_____

Signature:_____ Date:_____

Mail a copy of this form and any additional data to the Secretary of the Interagency Coordinating Committee

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Exhibit K-2

Air Quality Dispersion Modeling
(Kleinfelder 2003)

AIR QUALITY DISPERSION MODELING REPORT FOR THE MARINE CORPS AIR STATION YUMA, ARIZONA

February 12, 2003

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A Modeling Report Prepared for:

Marine Corps Air Station
Yuma, Arizona

Submitted to:

Arizona Department of Environmental Quality
Phoenix, Arizona

AIR QUALITY DISPERSION MODELING REPORT FOR THE MARINE CORPS AIR STATION YUMA, ARIZONA

Kleinfelder Job No: 21089

Prepared by:

V. Kristopher Allen, EIT
Air Quality Project Professional

Reviewed by:

Russell Erbes, CCM
Senior Air Quality Program Manager

KLEINFELDER, INC.
5015 Shoreham Place
San Diego, CA 92122
(858) 320-2019

February 12, 2003

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Appendix A Modeling Protocol submitted on 7 November 2002
Appendix B Response to ADEQ Comments (31 December 2002)
Appendix C Readme File Describing Modeling Files and Disk Containing Modeling Files

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LIST OF ACRONYMS

AAAQG	Arizona Ambient Air Quality Guidelines
ADEQ	Arizona Department of Environmental Quality
DoD	Department of Defense
DODIC	Department of Defense Identification Code
DOS	Data Operating System
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
GEP	Good Engineering Practice
hr	hour
ISC	Industrial Source Complex
km(s)	kilometer(s)
lb(s)	pound(s)
MCAS	Marine Corp Air Station
MTR	Munitions Treatment Range
NAAQS	National Ambient Air Quality Standards
NEW	Net Explosive Weight
NOD	Notice of Deficiency
NSN	national stock number
NWS	National Weather Service
OB	Open Burning
OD	Open Detonation
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendment and Reauthorization Act
TRI	Toxic Release Inventory
TRI-DDS	Toxics Release Inventory Data Delivery System
mg/m^3	micrograms per cubic meter
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
WP	White Phosphorus

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EXECUTIVE SUMMARY

The Barry M. Goldwater Range (Goldwater Range) is located in the extreme southwestern portion of Arizona. The Goldwater Range has been operating since 1941 for the training of pilots in aerial and air-to-ground combat. Marine Corps Air Station (MCAS) Yuma, located in Yuma, Arizona, operates four ranges on the western third of the Goldwater Range: two manned ranges, an air-to-air gunnery range, and an air combat maneuvering range. MCAS Yuma also operates a Munitions Treatment Range (MTR) near the far western boundary of the Goldwater Range.

The MTR is regulated under the Resource Conservation and Recovery Act (RCRA) and treats a wide variety of ordnance from different sources. As part of its review of the RCRA Part B Permit Application 1998 Update for the MTR, the Arizona Department of Environmental Quality (ADEQ) requested that MCAS Yuma evaluate the potential ambient air quality impact of certain compounds listed in the *1992 Arizona Ambient Air Quality Guidelines (AAAQG)*. These compounds (termed AAAQG compounds) have the potential for direct or indirect health effects, if a sensitive person is exposed for a sufficient length of time at a sufficient ambient concentration. An ambient air quality modeling protocol (Appendix A) was submitted on November 7, 2002 and approved by ADEQ on December 20, 2002 with a few minor comments. Response to ADEQ comments are provided in Appendix B. This modeling report summarizes the AAAQG impact evaluation modeling results, which was performed in accordance with the Modeling Protocol. This report was prepared on behalf of the MCAS Yuma by Kleinfelder, Inc., under subcontract to CDM Federal Programs Corporation.

In order to complete the AAAQG impact evaluation, three major steps were conducted: determine emissions for each AAAQG compound, model the ambient concentrations of each compound at the place where the public could be exposed, and compare the modeled results to the AAAQG concentration for each compound.

In order to estimate emissions, Kleinfelder obtained the record of munitions treated at the MTR for the calendar year 2000 and 2001, and used a Department of Defense (DoD) emissions database to estimate emissions for a hypothetical "worst-case" explosive mix that could be treated at the MTR. This explosive mix was modeled for the anticipated RCRA-permitted conditions of one maximum 3,000-pound (lb) net explosive weight (NEW) shot per hour, two shots per day, 365 days per year.

The MTR treats two general categories of munitions: white phosphorus (WP) which is usually used as a smoke generator for marking ordnance drop locations, and Class A/B munitions such as bombs, rockets, ammunition, etc. At the MTR, treatment of these two types of munitions occurs

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separately. Therefore, various emission scenarios were evaluated for different averaging times: WP shots only, Class A/B shots only, and a mix of Class A/B and WP shots.

In order to conduct the ambient air quality impact modeling, five years of meteorological data from the MCAS Yuma on-site surface (10-meter tower) weather station (the same weather station used by the Yuma International Airport) were obtained as pre-processed Industrial Source Complex (ISC) -ready data from Trinity Consulting. The upper air station used to prepare the ISC-ready data is the Tucson National Weather Service (NWS) station. The most recent five years of data available with the highest data capture rates (years 1993-1997) were used for modeling. The MCAS Yuma weather station is located about 17 kilometers (kms) northwest of the MTR. The terrain near the MTR is extremely flat, although there is a mountain range about 19 kms east of the MTR. However, the highest AAAQG impacts are near the MTR, and the mountain range and other complex terrain are not an issue.

The standard United States Environmental Protection Agency (USEPA)-approved dispersion model, ISC3 was chosen to perform the AAAQG impact analysis. Regulatory defaults were selected. One hour (hr), 24-hr, and annual ambient concentrations of AAAQG compounds were calculated. Since the maximum AAAQG impacts are near the facility, and complex terrain is not an issue, a single tight receptor grid surrounded by a coarse grid was used in the modeling. MTR operations occur only during daylight, and early during the day. Therefore, all hours from 0600 to 1400 were modeled even though, during winter months, this captures hours prior to sunrise when stable meteorological conditions may exist. However, the results during these hours do not indicate impacts greater than the AAAQGs.

The Arizona Department of Health Services prepared a list of AAAQG compounds in 1992 and a draft update in 1999. The 1999 list includes additional compounds such as lead and ozone, which reference the National Ambient Air Quality Standards (NAAQS). The ADEQ requested the analysis be based on the 1992 list of AAAQGs. However, because emission values for lead and ozone were obtained for the MTR and are based on referenced NAAQS levels in the 1999 update AAAQG list, they were included in the evaluation. The 1992 list of AAAQG compounds were used as the basis for comparing the modeled results for the remaining compounds. The AAAQGs represent health-based guidelines that are protective of the most sensitive individuals. These guidelines tend to have low threshold ambient concentrations for potential health effects. The AAAQG analyses are source-specific and do not combine impacts with other sources nor background concentrations.

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Results of the modeling indicate the air quality impacts from operations at the MTR are below the AAAQG levels (or NAAQS levels for ozone and lead) for each of the averaging periods and munitions treatment scenarios. Of the compounds emitted from munitions treatment, based on evaluations conducted for the Toxic Release Inventory (TRI), a total of 37 compounds were listed as AAAQG compounds.

For the 1-hr averaging period, a maximum 3,000-lb WP or 3,000-lb Class A/B detonation was considered to occur within an hour. The modeling results indicate that the maximum 1-hr impacts occur from the 3,000-lb Class A/B detonation. Of the 37 compounds, 31 have a 1-hr AAAQG from the 3,000-lb Class A/B detonation, for which 28 compounds were indicated to be less than 1% of the AAAQG levels, with the maximum impact at 44% of the AAAQG level from manganese compounds and the second highest impact at 13% of the AAAQG level from barium compounds.

For the 24-hr averaging period, two 3,000-lb Class A/B detonations or two 3,000 lb WP detonations, or a mix of one 3,000 lb Class A/B and one 3,000-lb WP detonations were considered as possible occurrences within a day. The modeling results indicate that the maximum 24-hr impacts occur from the mix scenario of one 3,000-lb Class A/B detonation and one 3,000-lb WP detonation in a day. Of the 37 compounds, 36 have a 24-hr AAAQG. From the mix scenario, 35 of these 36 compounds were indicated to be less than 1% of the AAAQG levels, with the maximum impact at 1.3% of the AAAQG level from manganese compounds and the second highest impact less than 0.6% of the referenced NAAQS level for lead compounds.

For the annual averaging period, a mix of Class A/B and WP detonations (3,000-lbs of each per day over 365 days per year) were modeled. Of the 37 compounds, 13 have an annual AAAQG. The modeling results indicate 12 of these 13 compounds are less than 1% of the AAAQG levels, with the maximum impact at 2.75% of the AAAQG level from nickel compounds and the second highest impact less than 0.02% of the referenced NAAQS level for lead compounds.

A summary of the maximum modeled impacts and locations for each averaging period are provided in Table EX-1. The maximum impacts occurred near the southern perimeter of the secured zone within the tight receptor grid surrounding the MTR, and decrease towards the outer edge of the tight receptor grid. The maximum 1-hr impact occurs approximately 1.60 km due south of the center of the MTR. The maximum 24-hr impact occurs approximately 1.68 km south south west of the center of the MTR. The maximum annual impact occurs approximately 1.63 km south south west of the center of the MTR. The maximum impacts at the nearest residential receptor, located approximately 6 km west-northwest of the MTR, were also evaluated for each

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averaging period and are summarized in Table EX-2. As shown in Table EX-2, the maximum impacts from Manganese Compounds and Lead Compounds at the nearest residential receptor are less than the AAAQG's for the 1-hour, 24-hour and annual averaging periods.

TABLE EX-1
Summary of Maximum Modeled Impacts

Averaging Period	Compounds with maximum impacts	Maximum Modeled Concentration ($\mu g/m^3$) *	AAAQG Guideline Limit ($\mu g/m^3$) *	Percent of AAAQG	Location (UTM) **
1-hr	Manganese Compounds	11.01	25	44%	732946.75 E*** 3599100.50 N
24-hr	Manganese Compounds	0.105	8.0	1.3%	732446.75 E*** 3599100.50 N
Annual	Nickel Compounds	0.00011	0.004	2.75%	732646.75 E*** 3599100.50 N

* $\mu g/m^3$ = concentration in micrograms per cubic meter.
** UTM = Universal Transverse Mercator.
*** Maximum impact locations for each averaging period are as follows:
Maximum 1-hr impact is approximately 1.60 km due south of the MTR
Maximum 24-hr impact is approximately 1.68 km due south of the MTR
Maximum annual impact is approximately 1.63 km due south of the MTR

TABLE EX-2
Summary of Maximum Impacts at the Nearest Residential Location*

Averaging Period	Compounds with maximum impact	Maximum Modeled Concentration ($\mu g/m^3$) *	AAAQG Guideline Limit ($\mu g/m^3$) **	% of AAAQG
1-hr	Manganese Compounds	3.14301	25	12.57%
24-hr	Manganese Compounds	0.01309	8.0	0.16%
Annual	Lead Compounds	0.00001	1.5	0.00067%

* The nearest residential location is approximately 6 km west north west of the MTR.
** $\mu g/m^3$ = concentration in micrograms per cubic meter.

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The following contact persons can be used to obtain additional information:

MCAS Yuma

Gil Guillory and Fred Daniel
MCAS Yuma Environmental Department
Building 228
Yuma, AZ 85369
Telephone (928) 269-2809
Fax (928) 269-5216

CDM Federal Programs Corporation

Randa Chichakli
CDM Federal Programs Corporation
3760 Convoy Street, Suite 210
San Diego, CA 92111
Telephone (858) 268-3383
Fax (858) 268-9677

Kleinfelder, Inc.

Kris Allen
Kleinfelder
4815 List Drive, Unit 115
Colorado Springs, CO 80919
Telephone (719) 632-3593
Fax (719) 632-2648

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1.0 INTRODUCTION

1.1 SITE LOCATION AND DESCRIPTION

The MTR is a fenced, secure square area, approximately 1 km by 1 km and is located near the far western boundary of the Goldwater Range in southwestern Arizona, 12 miles south-southeast of MCAS Yuma, and in Section 33, Township 10S, Range 22W. It is approximately 13 kms north of the Arizona/Mexico border and 36 kms southeast of the Arizona/California border, approximately 24 kms southeast of the town of Yuma, Arizona. Figure 1-1 shows the MTR location.

The site has been closed to the public for more than 40 years and is undeveloped. The terrain in the immediate vicinity of the MTR is extremely flat and the site elevation is approximately 66 meters above mean sea level (MSL), and generally slopes to the west-northwest at an average grade of 25 feet per mile. No elevated or depressed terrain exists. General surface conditions consist of bare ground, with negligible vegetation.

Procedures for munitions treatment included Open Burning (OB) and Open Detonation (OD) of munitions and explosive ordnances. The MTR was used to conduct OB operations in the past but has ceased the OB operations and currently is only used to conduct OD operations. The MTR includes three separate areas with footprints of between 2,500 and 10,000 square feet; (1) the former OB Area, (2) the WP Detonation Area and (3) the Class A/B Detonation Area. The OB area was clean-closed under RCRA in February 2001.

The MTR operates OD activities under interim status as a hazardous waste miscellaneous unit (40 Code of Federal Regulations 264.600, Subpart X - Miscellaneous Units). Two primary types of munitions are detonated at the MTR: Class A/B explosives, which are the "traditional" munitions such as bombs, grenades, rifle ammunition, etc., and WP, which is primarily used as a smoke marker for military operations. There are four "shot holes" (1 to 2-meter deep depressions used for detonating munitions) in the Class A/B area, and three shot holes in the WP area. The Universal Transverse Mercator (UTM) coordinates of the MTR and shot holes are shown in Table 1-1. The UTM coordinates are provided in AND 83, UTM Zone 11 South.

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TABLE 1-1
MTR and Shot Hole UTM Coordinates

Item	Easting (meters)	Northing (meters)
Northeast MTR Corner	733430	3601226
Northwest MTR Corner	732440	3601210
Southeast MTR Corner	733453	3600180
Southwest MTR Corner	732460	3600175
Class A/B Shot Hole 1	732874	3600928
Class A/B Shot Hole 2	732814	3600892
Class A/B Shot Hole 3	732926	3600799
Class A/B Shot Hole 4	733017	3600843
WP Shot Hole 1	732907	3600343
WP Shot Hole 2	732898	3600358
WP Shot Hole 3	732915	3600378
Approximate Centroid of Class A/B Shot Holes	732908	3600865
Approximate Centroid of WP Shot Holes	732907	3600360

Notes: Coordinates are provided in NAD 83, UTM Zone 11 south.

Table 1-1 shows that the Class A/B shot holes are all within 100 to 200 meters of each other, and the WP shot holes are within 30 to 40 meters of each other. Therefore, for modeling purposes, the Class A/B shot holes were represented by a single UTM coordinate (the approximate centroid), and likewise the WP area was represented by a single UTM coordinate (the approximate centroid). The Class A/B and WP centroid locations are shown on Figure 1-2.

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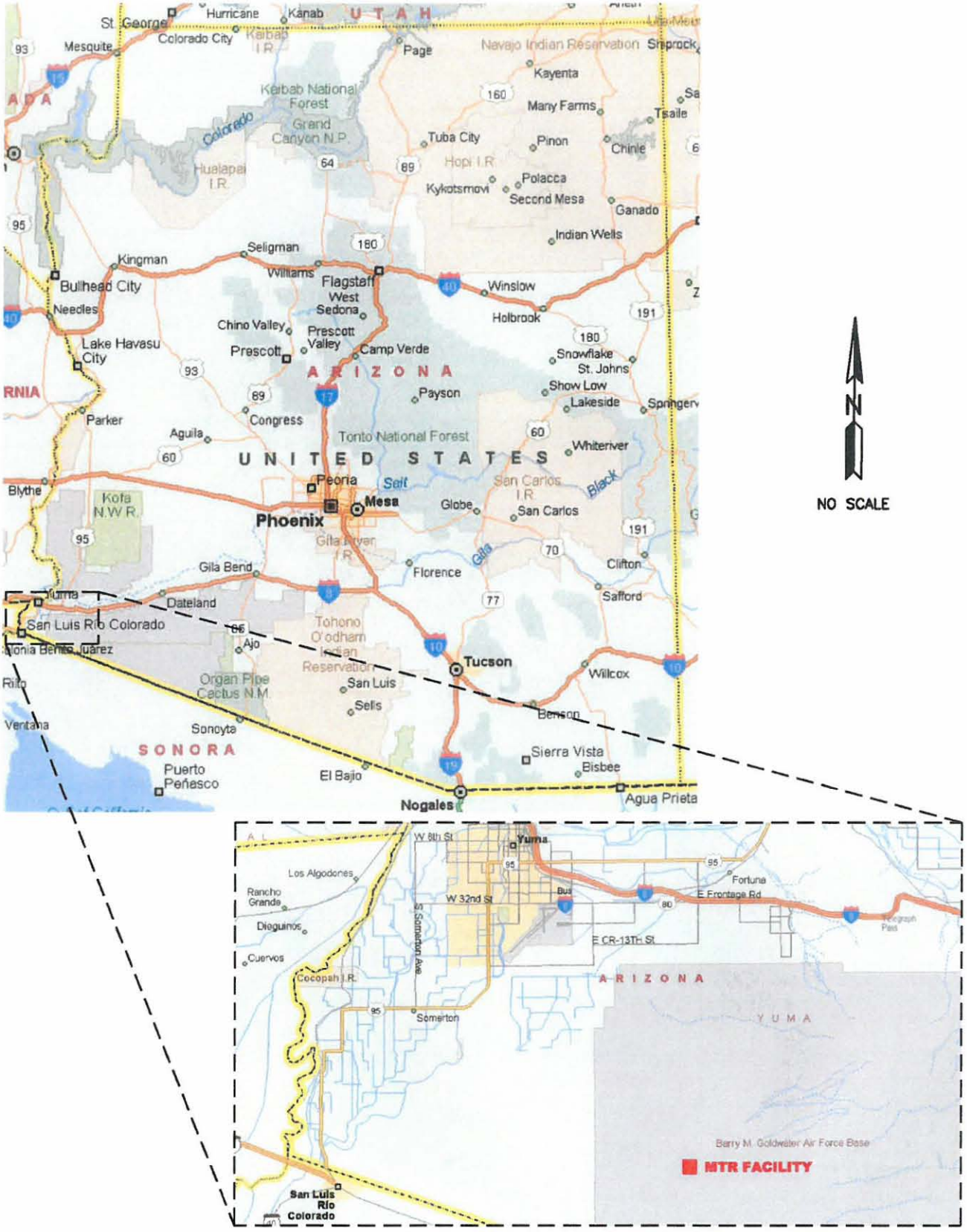
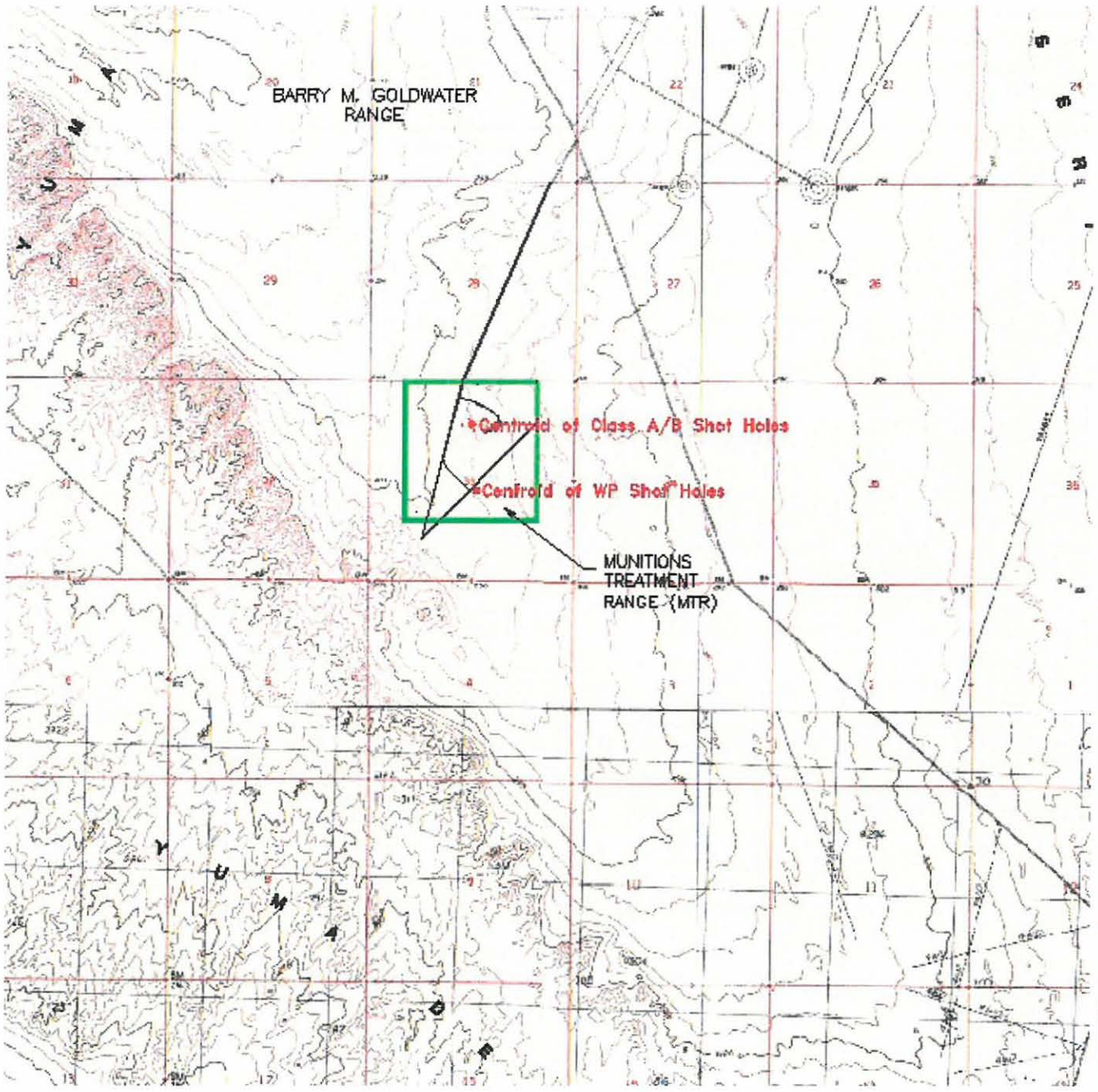


KLEINFELDER 4815 LIST DRIVE, UNIT 115 COLORADO SPRINGS, CO 80919	MCAS YUMA MTR LOCATION BARRY M. GOLDWATER RANGE MCAS YUMA, YUMA, ARIZONA
CHECKED BY: / FN: VICINITY MAP PROJECT NO. 21089 / DATE: 10/02	FIGURE 1 – 1

E:\FIGURES\FIG 1-1 VICINITY MAP.DWG, 10/14/2003 10:50:24 AM



KLEINFELDER

4815 LIST DRIVE, UNIT 115
COLORADO SPRINGS, CO 80919

CHECKED BY:	FN: MTR PLAN
PROJECT NO. 21089	DATE: 10/02

MCAS YUMA MTR SHOT HOLE LOCATION

BARRY M. GOLDWATER RANGE
MCAS YUMA, YUMA, ARIZONA

FIGURE

1-2

1.2 PROJECT HISTORY

This Modeling Report, for the AAAQG impact analysis at MCAS Yuma, is being submitted in partial response to the 28 February 2002 draft Second Notice of Deficiency (NOD) to the RCRA Part B Permit Application 1998 Update.

In September 1998, MCAS Yuma submitted a RCRA Part B Permit Application 1998 Update for the Barry M. Goldwater Air Force Range, Arizona. This 1998 application update superseded the two Part B applications previously prepared for the MCAS Yuma and Luke Air Force Base MTR facilities in 1988 and in 1993.

In June 2000, ADEQ issued a draft First NOD to the RCRA Part B Permit Application 1998 Update recommending that MCAS Yuma include a detailed methodology for estimation of emissions, atmospheric, meteorological and topographical characteristics of the MTR and the surrounding area, existing air quality profile, potential impacts to human health and the environment, and a screening assessment.

In response to this First NOD, MCAS Yuma submitted a Response to Comments on 29 August 2001. The Response to Comments included projected emissions from explosives detonation, atmospheric, meteorological and topographical characteristics of the MTR and the Goldwater Range, and air quality information collected in the 1997 Yuma Training Range Complex Final Environmental Impact Statement (EIS). The 1997 EIS concluded that the ambient air quality at the Goldwater Range (and specifically the MTR) is considered good to excellent.

On 28 February 2002, ADEQ issued a draft Second NOD to the RCRA Part B Permit Application 1998 Update and August 2001 Response to Comments recommending that MCAS Yuma provide a worst case emission inventory, ambient air quality in the immediate vicinity of the MTR, dispersion modeling analysis, and comparison of ambient concentrations to applicable standards.

MCAS Yuma, the Navy, ADEQ, and USEPA held a meeting on 17 May 2002 to discuss the issues raised in the Second NOD. As a result of this meeting, a mutually agreeable plan of action was developed for MCAS Yuma's response to ADEQ's comments. It was agreed that MCAS Yuma would conduct AAAQG impact analysis and the results will ultimately support the final RCRA Part B Permit for the MTR.

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2.0 AMBIENT DATA REQUIREMENTS

Consistent with standard ADEQ practice, AAAQG analysis is conducted on a source-by-source basis and potential background concentrations of AAAQG compounds are not included in an AAAQG analysis. In addition, the MTR is by design located in an isolated, very sparsely populated area, and significant background AAAQG compound concentrations are not expected. Therefore, no background ambient air quality data were obtained and the AAAQG impact analysis was based on an isolated source impact analysis.

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3.0 EMISSION INVENTORY

This analysis includes only AAAQG compound emissions. There are two components to the source emission inventory: emission characteristics (e.g., release height) and emission rates (i.e., pounds of AAAQG compounds emitted). The emission characteristics will be discussed first.

3.1 EMISSION CHARACTERISTICS

The emissions from MTR activities are all fugitive emissions resulting from OD of munitions. No OB of munitions occurs at MTR. There are two types of OD: tamped and untamped. Tamped OD involves placing the munitions in a shot hole and covering it with dirt to reduce the fragmentation pattern of metal components in the detonated munitions. The second type of OD is untamped, where the munitions are placed in a shot hole but not covered with dirt. Untamped detonation is used for smaller munitions/smaller explosive weight detonations and for WP detonations (since WP must be exposed to air in order to achieve desired results).

RCRA Part B Permit Application Update will allow up to 3,000 lb NEW to be detonated in a single shot at the MTR. NEW is the weight of the explosive materials only calculated as the TNT-equivalent weight of the energetic components. The RCRA Permit will also limit MTR operations to no more than two such shots (i.e., 3,000-lb NEW shots) per day, but allows 365 days per year operation. If the MTR detonates a 3,000-lb NEW shot, logistical and safety demands make it virtually impossible to detonate more than one such shot per hour. It is possible, although rarely if ever occurs, for the MTR to detonate more than one shot per hour and more than two shots per day if the shots are for NEWs much less than 3,000 lbs. Since the greater the NEW the greater the emissions, for purposes of the hourly AAAQG assessment, a single 3,000-lb NEW shot per hour was modeled. Since the shot can be either WP or Class A/B, two emission scenarios were examined for the hourly AAAQG assessment (one Class A/B and one WP).

As stated, up to two 3,000-lb NEW shots can occur per day. It is possible that both of the 3,000-lb NEW shots are Class A/B or both WP or a mix. Therefore, the following three emission scenarios were modeled for the 24-hr AAAQG evaluation:

- Two Class A/B shots per day
- One Class A/B and one WP shot per day
- Two WP shots per day

On an annual basis, there will be a mix of both Class A/B and WP shots. Therefore, for the annual AAAQG assessment, it was assumed that 365 Class A/B and 365 WP shots occur per year.

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Note that the actual number of shots and quantity of explosives detonated over the last several years is significantly less than assumed for these emissions scenarios. A 3,000-lb NEW shot is very rare and two shots per day almost never occur. In addition, MTR detonations actually occur on the order of only about 60 different days per year.

The shots are all detonated at ground level (in the shot holes). However, if a 3,000-lb NEW shot occurs, the energetic materials will cause the emissions to reach a significant height and spread to a significant diameter immediately upon detonation. Therefore, the emissions were modeled as a "volume" source. MTR staff has observed the initial plume diameter of such large shots (i.e., the 3,000-lb shot) to be on the order of 900 feet (275 meters). Accordingly, this dimension (275 meters) was used as the initial horizontal dimension of the volume source. The MTR has an aviation clearance during MTR operations of 2,000 feet (i.e., no aircraft are allowed lower than 2,000 feet above ground level). If the MTR plans to detonate a 3,000-lb shot, the Federal Aviation Administration (FAA) would be contacted to obtain a greater altitude clearance. However, since the default clearance is 2,000 feet, this height was used as the initial plume height (i.e., 600 meters). Per standard ISC-modeling procedures, the volume source "release height" for modeling purposes was set at the mid-point of the volume source height, 300 meters.

3.2 EMISSION ESTIMATES

There are thousands of different kinds of munitions that could be treated at the MTR except for nuclear, chemical, and biological weapons, which are not treated at the MTR. In addition, there are more than 20 different energetic families (i.e., types of explosives) that the thousands of different munitions can use in widely differing amounts. Finally, the different kinds of munitions contain different non-energetic components that could also be emitted. Therefore, a methodology had to be developed to estimate emissions for the MTR.

The first step in estimating emissions was to obtain an emissions database, developed for the DoD, to estimate emissions from munitions manufacturing, OD, and OB. This database is used by DoD installations as part of their USEPA TRI or Superfund Amendment Reauthorization Act (SARA 313) reporting. The database, *Toxics Release Inventory Data Delivery System, TRI-DDS 2000*, published by the URS Corporation in March 2001, was made available to Kleinfelder. The database is an ACCESS-platform database that provides emission estimates in terms of pounds of emissions per item. Each munition in the database is coded by its standard nomenclature, national stock number (NSN) and DoD Identification Code (DODIC). The TRI-DDS includes only emissions for TRI compounds. However, most of the AAAQG compounds are TRI compounds and vice versa, so this limitation was not considered serious.

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The second step in estimating emissions was to obtain a list of the munitions detonated at the MTR in the calendar years 2000 and 2001. The third step was to access the TRI-DDS and obtain the emissions of TRI compounds (in terms of lbs of emitted compound per item).

There are from 3 to over 30 different AAAQG compounds emitted for each of the different munitions that have been detonated at the MTR. And the emission rate (in terms of lbs of emitted AAAQG compound per item weight and/or lbs of emitted AAAQG compound per NEW) also varies considerably. It is not possible to model each individual munition detonated at MTR (that would be over 115 different munitions for 2000/2001 alone). Likewise, it is not possible to model each of the more than 4,500 different munitions that could be detonated. Therefore, a hypothetical "worst-case" explosive mix and set of emissions for a 3,000-lb NEW shot had to be generated. The following steps were used to generate this worst-case, hypothetical explosive mix.

First, the individual emissions for all of the MTR 2000/2001 detonated munitions were combined into a single spreadsheet of emissions (pounds of each AAAQG compound emitted per item). This set of emissions was sorted by AAAQG compound, so that the maximum emission of each AAAQG compound, regardless of the source (i.e., specific munition) of that compound, could be found. That set of maximum emissions was then compiled into a single table, as shown in Table 3-1. Secondly, MCAS Yuma staff supplied the NEW for each munition listed in Table 3-1. Thirdly, the maximum AAAQG emissions from the listed munitions were scaled-up to represent the maximum theoretical emissions for a 3,000-lb NEW shot, as shown in Table 3-1.

The set of emissions shown in Table 3-1 was modeled for each Class A/B shot. In other words, it was assumed that every shot would always be a mix of those munitions and would yield the maximum emissions for each AAAQG compound.

Note from Table 3-1 that all of the listed munitions are Class A/B explosives. That is due to the fact that the MTR did not detonate WP during 2000/2001. Therefore, the Table 3-1 data were only for the Class A/B detonation scenarios. In order to obtain a set of emissions for WP detonation, the TRI-DDS database was queried to identify a representative WP munition, a smoke grenade. Table 3-2 shows the emissions from a smoke grenade and the scale-up to a 3,000-lb NEW WP shot. It is highly unlikely that the MTR will detonate a 3,000-lb WP shot but, since it is possible, an assumption has been used to model the worst-case WP detonation.

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Table 3-1
Emission Estimates for Worst Case Hypothetical Shot Munition Mix (Class A/B Explosives)

	1	2	3	4	5	6	7	8	9	10	11
Munition Number	Nomenclature	DODIC	Analyte_Name	Emisson Factor (lbs/item)	NEW (lbs) (Note 1)	NEW (lbs) per 3000 lb NEW Shot	Emissions for One Shot (lbs/shot) (Note 2)	Emissions per Hour (g/s) (Note 3)	Emissions per 24 hr (g/s) (Note 4)	Emissions per Year (lb/yr) (Note 5)	Emissions per Year (g/s) (Note 6)
1	BOMB CLUSTER ANTI-TANK MK20 MOD3	E173	Nickel compounds	1.647E-01	100.0000	390.2004	6.425E-01	8.10E-02	6.75E-03	2.85E+05	3.37E-03
2	BOMB GP 1000LB MK83 MOD4	E507	1,3-Butadiene	6.230E-04	445.0000	1,736.3916	2.431E-03	3.06E-04	2.55E-05	1.27E+06	1.28E-05
	BOMB GP 1000LB MK83 MOD4		Acetaldehyde	4.450E-04	445.0000	1,736.3916	1.736E-03	2.19E-04	1.82E-05	1.27E+06	9.12E-06
	BOMB GP 1000LB MK83 MOD4		Ammonia	4.450E-04	445.0000	1,736.3916	1.736E-03	2.19E-04	1.82E-05	1.27E+06	9.12E-06
	BOMB GP 1000LB MK83 MOD4		Benzene	3.204E-03	445.0000	1,736.3916	1.250E-02	1.58E-03	1.31E-04	1.27E+06	6.56E-05
	BOMB GP 1000LB MK83 MOD4		Carbonyl sulfide	2.384E-04	445.0000	1,736.3916	9.303E-04	1.17E-04	9.77E-06	1.27E+06	4.88E-06
	BOMB GP 1000LB MK83 MOD4		Ethylbenzene	8.010E-04	445.0000	1,736.3916	3.126E-03	3.94E-04	3.28E-05	1.27E+06	1.64E-05
	BOMB GP 1000LB MK83 MOD4		Formaldehyde	4.450E-04	445.0000	1,736.3916	1.736E-03	2.19E-04	1.82E-05	1.27E+06	9.12E-06
	BOMB GP 1000LB MK83 MOD4		Hydrogen cyanide	4.450E-04	445.0000	1,736.3916	1.736E-03	2.19E-04	1.82E-05	1.27E+06	9.12E-06
	BOMB GP 1000LB MK83 MOD4		Hydrogen sulfide	1.818E-02	445.0000	1,736.3916	7.092E-02	8.94E-03	7.45E-04	1.27E+06	3.72E-04
	BOMB GP 1000LB MK83 MOD4		n-Hexane	2.448E-04	445.0000	1,736.3916	9.550E-04	1.20E-04	1.00E-05	1.27E+06	5.01E-06
	BOMB GP 1000LB MK83 MOD4		Nitric acid	6.900E-04	445.0000	1,736.3916	3.473E-03	4.38E-04	3.65E-05	1.27E+06	1.82E-05
	BOMB GP 1000LB MK83 MOD4		Ozone	8.900E-04	445.0000	1,736.3916	3.473E-03	4.38E-04	3.65E-05	1.27E+06	1.82E-05
	BOMB GP 1000LB MK83 MOD4		Sulfuric acid	5.335E-05	445.0000	1,736.3916	2.082E-04	2.62E-05	2.19E-06	1.27E+06	1.09E-06
	BOMB GP 1000LB MK83 MOD4		Toluene	1.468E-03	445.0000	1,736.3916	5.730E-03	7.22E-04	6.02E-05	1.27E+06	3.01E-05
3	GREN HAND SMK HC AN-M8	G930	Chlorine	1.220E-01	1.2000	4.6824	4.762E-01	6.00E-02	5.00E-03	3.42E+03	2.50E-03
	GREN HAND SMK HC AN-M8		Hydrochloric acid	3.072E-01	1.2000	4.6824	1.199E+00	1.51E-01	1.26E-02	3.42E+03	6.29E-03
	GREN HAND SMK HC AN-M8		Zinc compounds	3.946E-01	1.2000	4.6824	1.540E+00	1.94E-01	1.62E-02	3.42E+03	8.08E-03
4	RCKT MTR JATO M8	H330	Molybdenum trioxide	8.295E-03	158.5000	618.4676	3.237E-02	4.08E-03	3.40E-04	4.51E+05	1.70E-04
5	RCKT MTR 5IN MK71 MOD0	J270	Lead compounds (inorganic)	6.720E-01	35.1270	137.0657	2.622E+00	3.30E-01	2.75E-02	1.00E+05	1.38E-02
6	SIGNAL SMK & ILLUM MARINE MK13 MOD0	L275	Antimony compounds	5.373E-04	0.2125	0.8292	2.097E-03	2.64E-04	2.20E-05	6.05E+02	1.10E-05
7	SIGNAL ILLUM GRND PARA RED STAR M126A1	L311	Carbon tetrachloride	4.064E-05	0.2900	1.1316	1.586E-04	2.00E-05	1.67E-06	8.26E+02	8.33E-07
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Chloroform	3.149E-05	0.2900	1.1316	1.229E-04	1.55E-05	1.29E-06	8.26E+02	6.45E-07
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Chloromethane (Methyl chloride)	1.334E-05	0.2900	1.1316	5.205E-05	6.56E-06	5.47E-07	8.26E+02	2.73E-07
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Dichloromethane (Methylene chloride)	2.249E-05	0.2900	1.1316	8.777E-05	1.11E-05	9.22E-07	8.26E+02	4.61E-07
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Hexachloroethane	6.223E-05	0.2900	1.1316	2.428E-04	3.06E-05	2.55E-06	8.26E+02	1.27E-06
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Tetrachloroethylene (Perchloroethylene)	4.385E-05	0.2900	1.1316	1.711E-04	2.16E-05	1.80E-06	8.26E+02	8.98E-07
8	FLARE ACFT PARA YLW M8A1	L388	Barium compounds	1.827E+00	10.3000	40.1906	7.127E+00	8.98E-01	7.48E-02	2.93E+04	3.74E-02
9	FLARE ACFT PARA MK45 MOD0 W/DROGUE TRAY	L426	Fluorine	6.945E-07	16.8250	65.6512	2.710E-06	3.41E-07	2.85E-08	4.79E+04	1.42E-08
	FLARE ACFT PARA MK45 MOD0 W/DROGUE TRAY		Manganese compounds	1.021E+01	16.8250	65.6512	3.984E+01	5.02E+00	4.18E-01	4.79E+04	2.09E-01
10	FLARE, IR CM MJU-7/B	L433	Boron trifluoride	6.105E-02	1.0000	3.9020	2.382E-01	3.00E-02	2.50E-03	2.85E+03	1.25E-03
	FLARE, IR CM MJU-7/B		Hydrogen fluoride	2.442E-02	1.0000	3.9020	9.529E-02	1.20E-02	1.00E-03	2.85E+03	5.00E-04
11	SIMULATOR FLASH ARTY M21	L602	Copper compounds	2.328E-03	0.0938	0.3660	9.084E-03	1.14E-03	9.54E-05	2.67E+02	4.77E-05
12	CHG DEMO BLOCK TNT 1/2LB	M031	Styrene	7.350E-07	0.5000	1.9510	2.868E-06	3.61E-07	3.01E-08	1.42E+03	1.51E-08
			Total NEW (lbs)		**768.8358**	**3,000.0**					

Notes:

1. NEW not available for H330, so used item weight. NEW for L433 was listed as zero, so used item weight.
2. Calculated by the ratio of 3000 lb NEW / 768.8.
3. Calculated by Emission /shot * 453.6 g /lb * 1hr /3600 * 1 shot /hr. Based on one Class A/B shot per hour.
4. Calculated by Emission /shot * 453.6 g /lb * 1hr /3600 sec * 2 shots /day * 1 day /24 hr. Based on two Class A/B shots per day.
5. Calculated by Emission /shot * 2 shots /day * 365 days /yr. Based on two Class A/B shots per day, 365 days per year.
6. Calculated by Emission /shot * 453.6 g /lb * 1hr /3600 sec * 1 shot /day * 365 days /yr * 1 yr /8760 hrs. For annual modeling purposes it was assumed only one Class A/B shot occurs per day.

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Table 3-2
Emission Estimates for Worst Case Hypothetical WP Shot

	1	2	3	4	5	6	7	8	9	10	10
Munition Number	Nomenclature	DODIC	Analyte_Name	Emisson Factor (lbs/item)	NEW (lbs) (Note 1)	NEW (lbs) per 3000 lb NEW Shot	Emissions for One Shot (lbs/shot) (Note 2)	Emissions per Hour (g/s) (Note 3)	Emissions per 24 hr (g/s) (Note 4)	Emissions per Year (Lb/yr) (Note 5)	Emissions per Year (g/s) (Note 6)
1	GREEN HAND SMK WP M15	G935	Nickel compounds	4.154E-04	1.9375	3,000.0	6.432E-01	8.10E-02	6.75E-03	4.70E+02	3.38E-03
	GREEN HAND SMK WP M15		Carbon disulfide	1.746E-08	1.9375	3,000.0	2.704E-05	3.41E-06	2.84E-07	1.97E-02	1.42E-07
	GREEN HAND SMK WP M15		Acetaldehyde	9.438E-07	1.9375	3,000.0	1.461E-03	1.84E-04	1.53E-05	1.07E+00	7.67E-06
	GREEN HAND SMK WP M15		Ammonia	7.614E-10	1.9375	3,000.0	1.179E-06	1.49E-07	1.24E-08	8.61E-04	6.19E-09
	GREEN HAND SMK WP M15		Chromium (III) Compounds	1.379E-03	1.9375	3,000.0	2.134E+00	2.69E-01	2.24E-02	1.56E+03	1.12E-02
	GREEN HAND SMK WP M15		Carbonyl sulfide	1.378E-08	1.9375	3,000.0	2.133E-05	2.69E-06	2.24E-07	1.56E-02	1.12E-07
	GREEN HAND SMK WP M15		Phosphoric Acid	9.375E-06	1.9375	3,000.0	1.452E-02	1.83E-03	1.52E-04	1.06E+01	7.62E-05
	GREEN HAND SMK WP M15		Formaldehyde	9.438E-07	1.9375	3,000.0	1.461E-03	1.84E-04	1.53E-05	1.07E+00	7.67E-06
	GREEN HAND SMK WP M15		Hydrogen cyanide	9.431E-07	1.9375	3,000.0	1.460E-03	1.84E-04	1.53E-05	1.07E+00	7.67E-06
	GREEN HAND SMK WP M15		Hydrogen sulfide	7.835E-09	1.9375	3,000.0	1.213E-05	1.53E-06	1.27E-07	8.86E-03	6.37E-08
	GREEN HAND SMK WP M15		Nitric acid	9.465E-07	1.9375	3,000.0	1.466E-03	1.85E-04	1.54E-05	1.07E+00	7.69E-06
	GREEN HAND SMK WP M15		Ozone	9.438E-07	1.9375	3,000.0	1.461E-03	1.84E-04	1.53E-05	1.07E+00	7.67E-06
	GREEN HAND SMK WP M15		Sulfuric acid	5.741E-08	1.9375	3,000.0	8.889E-05	1.12E-05	9.33E-07	6.49E-02	4.67E-07
	GREEN HAND SMK WP M15		Chlorine	8.720E-09	1.9375	3,000.0	1.350E-05	1.70E-06	1.42E-07	9.86E-03	7.09E-08
	GREEN HAND SMK WP M15		Hydrochloric acid	1.460E-05	1.9375	3,000.0	2.261E-02	2.85E-03	2.37E-04	1.65E+01	1.19E-04
	GREEN HAND SMK WP M15		Lead compounds (inorganic)	4.838E-04	1.9375	3,000.0	7.491E-01	9.44E-02	7.87E-03	5.47E+02	3.93E-03
	GREEN HAND SMK WP M15		Antimony compounds	3.379E-06	1.9375	3,000.0	5.232E-03	6.59E-04	5.49E-05	3.82E+00	2.75E-05
	GREEN HAND SMK WP M15		Carbon tetrachloride	1.388E-05	1.9375	3,000.0	2.149E-02	2.71E-03	2.26E-04	1.57E+01	1.13E-04
	GREEN HAND SMK WP M15		Chloroform	1.176E-08	1.9375	3,000.0	1.821E-05	2.29E-06	1.91E-07	1.33E-02	9.56E-08
	GREEN HAND SMK WP M15		Chloromethane (Methyl chloride)	4.960E-09	1.9375	3,000.0	7.680E-06	9.68E-07	8.06E-08	5.61E-03	4.03E-08
	GREEN HAND SMK WP M15		Dichloromethane (Methylene chloride)	7.840E-09	1.9375	3,000.0	1.214E-05	1.53E-06	1.27E-07	8.86E-03	6.37E-08
	GREEN HAND SMK WP M15		Hexachloroethane	2.004E-08	1.9375	3,000.0	3.103E-05	3.91E-06	3.26E-07	2.27E-02	1.63E-07
	GREEN HAND SMK WP M15		Tetrachloroethylene (Perchloroethylene)	1.388E-08	1.9375	3,000.0	2.149E-05	2.71E-06	2.26E-07	1.57E-02	1.13E-07
	GREEN HAND SMK WP M15		Barium compounds	9.337E-04	1.9375	3,000.0	1.446E+00	1.82E-01	1.52E-02	1.06E+03	7.59E-03
			Total NEW (lbs)		**1.9375**	**3,000.0**					

Notes:

1. NEW not available for G935, so used item weight.
2. Calculated by the ratio of 3000 lb NEW / 1.9
3. Calculated by Emission /shot * 453.6 g /lb * 1hr /3600 * 1 shot /hr. Based on one WP shot per hour.
4. Calculated by Emission /shot * 453.6 g /lb * 1hr /3600 sec * 2 shots /day * 1 day /24 hr. Based on two WP shots per day.
5. Calculated by Emission /shot * 2 shots /day * 365 days /yr. Based on two WP shots per day, 365 days per year.
6. Calculated by Emission /shot * 453.6 g /lb * 1hr /3600 sec * 1 shot /day * 365 days /yr * 1 yr /8760 hrs. For annual modeling purposes it was assumed only one WP shot occurs per day.

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4.0 TOPOGRAPHY, CLIMATOLOGY, AND METEOROLOGY

4.1 REGIONAL TOPOGRAPHY

Figure 1-2 shows the terrain in the immediate vicinity of the MTR to be extremely flat, although the Gila Mountain Range is about 19 kms east of the MTR. Since the maximum AAAQG impacts were expected nearest the MTR, the modeling was conducted in flat terrain mode (i.e., no intermediate or complex terrain was considered).

The land use within a 3-km radius of the MTR is rural. Therefore, rural dispersion coefficients were selected for the modeling analysis.

4.2 REGIONAL CLIMATOLOGY

The MTR is located in a classic desert environment, characterized by high temperatures and an unstable atmosphere during the day, and significant radiational cooling and a stable atmosphere at night. However, MTR operations occur only during the early daytime hours (0600 to 1400). Infrequent thunderstorms in the late summer/early fall are the primary source of rainfall in the area.

4.3 REGIONAL METEOROLOGY

Surface meteorological data are measured at two locations in the MTR region: the MCAS Yuma airport (same location as the Yuma International Airport) and the Yuma Proving Ground. The Yuma Proving Ground meteorological station is located on the Goldwater Range near the MTR; however, the data that capture statistics for that station are relatively low and the years of data collection relatively incomplete. On the other hand, there are complete data available at the MCAS Yuma station (Station 699604). The MCAS Yuma meteorological station is located at 32.65 degrees North, 114.617 degrees West, approximately 17 kms northwest of the MTR, with no intervening terrain that would significantly affect the meteorology at the MTR compared to the MCAS Yuma location. Table 4-1 presents the data capture statistics for the MCAS Yuma station since 1992 (2000 and 2001 data are not yet commercially available). As shown in Table A-1, the most complete five-year period of data is from 1993 to 1997. Therefore, this five-year period was used for the dispersion modeling surface wind speed, wind direction and temperature. Upper air data was obtained from the Tucson International Airport station, the nearest upper air station to the MTR. The Tucson and MCAS Yuma data were pre-processed by Trinity Consultants and purchased ISC-ready.

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TABLE 4-1
MCAS Yuma Meteorological Station Data Capture

Year	Hours	Data Capture Percent
2000*	7962	91
1999	8194	94
1998	8396	96
1997	8641	99
1996*	8628	98
1995	8672	99
1994	8727	99
1993	8641	99
1992*	8708	99

* Leap Year

Calm wind speed and direction was treated with the regulatory default switch setting in the model of "CALM OFF." Missing data was substituted using the USEPA missing data routines; however, as noted above, the data capture is very high and missing data was not an issue.

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5.0 MODELING ANALYSIS DESIGN

5.1 MODEL SELECTION

The ISC3 model was used for the analysis (current version 02035). The standard DOS-based version available from the USEPA Bulletin Board was used. Regulatory default settings and rural dispersion coefficients were utilized.

No screening modeling was conducted since the meteorological data, emissions data, and receptor set were relatively well determined.

5.2 RECEPTORS

A set of Cartesian receptor grids were used for the model plus one discrete receptor, the nearest residence, located approximately 5.9 kms northwest of the MTR. A tight receptor grid was placed 1.6 kms from the center of the MTR and consisted of receptors spaced every 100 meters out to 2.1 kms. A coarse receptor grid was placed 2.5 kms from the center of the MTR and consisted of receptors spaced every 500 meters out to 7.0 kms from the center of the MTR. The center of the MTR is located at approximately 732946 East, 3600700 North UTM Zone 11. The discrete receptor (nearest residence) is located at 727261 East, 3602670 North UTM Zone 11. Figure 5-1 shows the receptor grids.

The maximum impacts were found to occur within the tight receptor grid and decrease towards the outer edge of the tight grid as discussed in Section 7 of this modeling report. Therefore no "hot spot" locations were necessary for evaluating impacts within the coarse grid.

The receptor grid begins 1.6 kms (1 mile) from the center of the MTR since MCAS Yuma does not allow anyone within a 1-mile radius during a shot. Therefore, no one can be exposed closer than 1.6 kms from the MTR. Prior to a shot, MCAS Yuma performs a visual clearance of the 1-mile radius area to ensure that no one is present.

Since the area is all flat terrain, no terrain elevation was input for the receptors.

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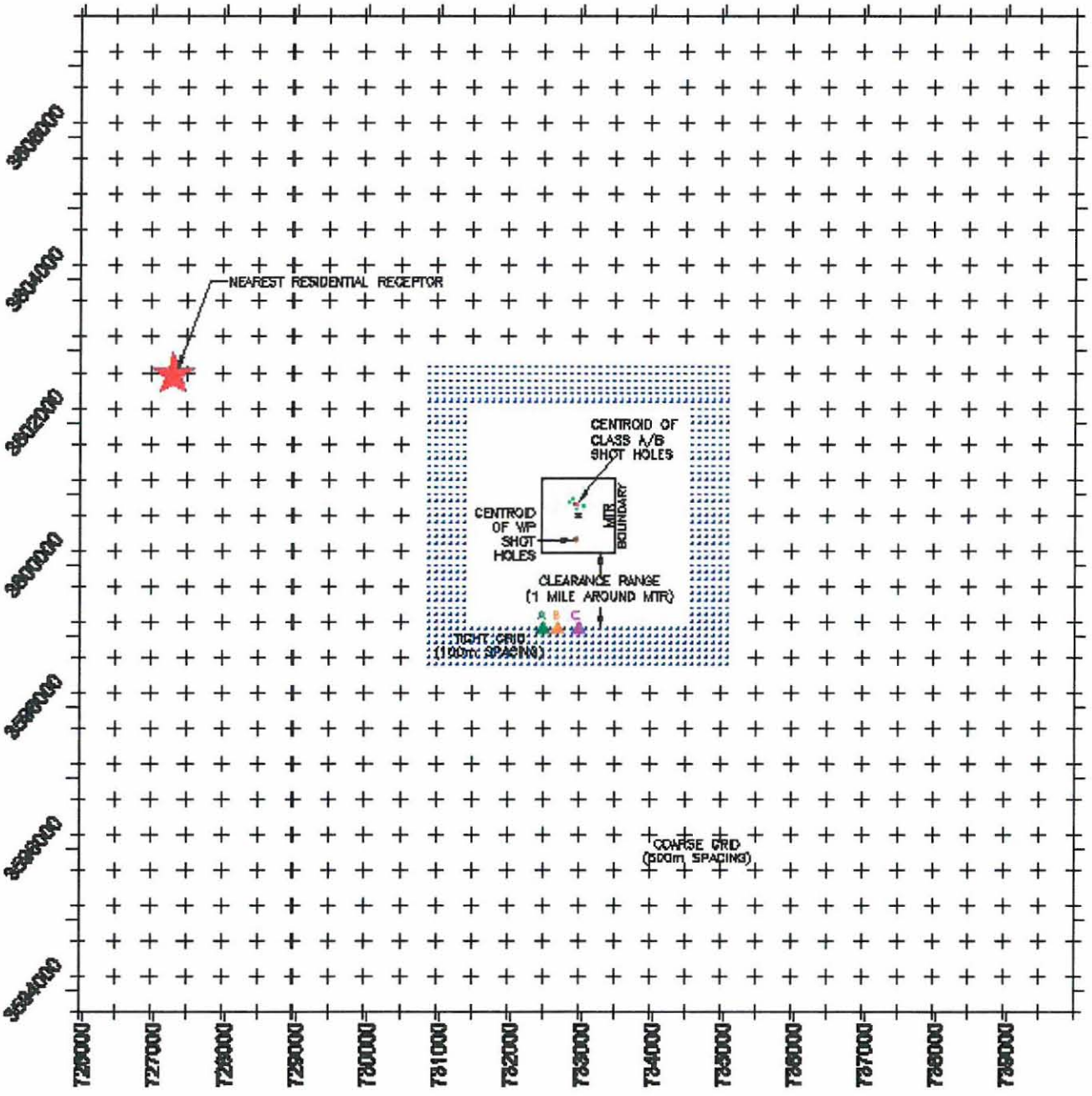

LEGEND:

A ▲ — MAXIMUM 24 HOUR IMPACT

B ▲ — MAXIMUM ANNUAL IMPACT

C ▲ — MAXIMUM 1 HOUR IMPACT

KLEINFELDER

4815 LIST DRIVE, UNIT 115
COLORADO SPRINGS, CO 80919

CHECKED BY:	FN: RECEPTOR GRIDS
PROJECT NO. 21089	DATE: 01/03

MCAS YUMA RECEPTOR GRIDS

BARRY M. GOLDWATER RANGE
MCAS YUMA, YUMA, ARIZONA

FIGURE

5—1

5.3 BUILDING WAKE DOWNWASH AND GEP

The emissions are all ground-level releases that do not emanate from a stack. In addition, there are no buildings in the MTR area. Accordingly, building wake downwash Good Engineering Practice (GEP) stack height was not relevant.

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6.0 IMPACT ANALYSIS

6.1 AAAQG ANALYSIS

The modeling analysis compared the ambient concentrations for each emitted AAAQG compound to the relevant AAAQG concentrations and averaging times. This was done by running the model once for each averaging period with the applicable emission rates shown in Tables 3-1 and 3-2 (grams per second) to obtain the resultant ambient concentrations ($\mu g/m^3$). Files used for the ISC assessment are provided on Disk in Appendix C.

The Arizona Department of Health Services prepared a list of AAAQG compounds in 1992 and a draft update in 1999. The 1999 list includes additional compounds such as lead and ozone, which reference the National Ambient Air Quality Standards (NAAQS). The ADEQ requested the analysis be based on the 1992 list of AAAQGs. However, because emission values for lead and ozone were obtained for the munitions treatment and are based on referenced NAAQS levels in the 1999 update AAAQG list, they were included in the evaluation. The 1992 list of AAAQG compounds were used as the basis for comparing the modeled results for the remaining compounds. The AAAQGs represent health-based guidelines that are protective of the most sensitive individuals. These guidelines tend to have low threshold ambient concentrations for potential health effects.

For a given compound, there are multiple AAAQG averaging times: 1-hr, 24-hr, and annual. The lead NAAQS is in terms of a quarterly average, and the ozone AAAQG is in terms of a 1-hr average. For comparison with the lead NAAQS, it was assumed that the annual average is equivalent to the quarterly average. Therefore the ISC model was run for 1-hr, 24-hr, and annual averages. The emission scenarios shown in Table 6-1 were modeled for each averaging period.

TABLE 6-1
Modeled Emission Scenarios and Averaging Times

Emission Scenario	Emission Assumption	Averaging Times
1A	One 3,000-lb NEW Class A/B shot	1-hr
1B	One 3,000-lb NEW WP shot	1-hr
2A	One 3,000-lb NEW Class A/B shot, One 3,000-lb NEW WP shot	24-hr
2B	Two 3,000-lb NEW Class A/B shots	24-hr
2C	Two 3,000-lb NEW WP shots	24-hr
3	365 Class A/B shots (3,000-lb NEW each) and 365 WP shots (3,000-lb NEW each)	Annual

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6.2 AAAQG COMPOUND FORM COMPARED TO EMISSIONS

The TRI-DDS emission database does not contain individual speciation of metal compounds; rather, it provides a single emission factor for each metal compound group. For example, the TRI-DDS presents a single emission factor for "copper compounds" combined. On the other hand, the AAAQGs are compound specific, e.g., "copper (fume)", "cuprous chloride", "cuprous oxide" all have individual AAAQGs. Therefore, when the TRI-DDS emissions are in terms of a metal compound group (e.g., copper compounds), the modeled ambient concentration for the metals group was compared to the individual metal AAAQG (e.g., copper fume). The following table lists the TRI-DDS metal listing and the AAAQGs to which the metal listing was compared in the ambient impact analysis.

TABLE 6-2
TRI-DDS Metal Compound Listing Compared to AAAQG

TRI-DDS Listing	AAAQG Compound used for comparison
Antimony Compounds	Antimony
Barium Compounds	Barium
Chromium (III) Compounds	Chromium
Copper Compounds	Copper Fume
Manganese Compounds	Manganese - Metal, Fume
Nickel Compounds	Nickel - Metal, Fume
Zinc Compounds	Zinc Oxide - Fume

6.3 OTHER NEARBY SOURCES

AAAQG analyses are source-specific and do not combine impacts with other sources nor background concentrations. In addition, the MTR is in a very isolated area (by design), so it is not expected that there would be a significant AAAQG contribution from background or other nearby sources, and no combined impacts modeling will be conducted.

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7.0 RESULTS OF AIR QUALITY MODELING ANALYSIS AND DETERMINATIONS

This section provides the results of the air quality impact analysis performed for the MTR at MCAS Yuma, Arizona. The methodologies adhere to the USEPA and ADEQ guidelines, and were conducted as described in the ADEQ approved Modeling Protocol, dated November 7, 2002 (Appendix A).

As described in Table 6-1 of this Modeling Report, six emission scenarios were modeled by averaging period. Table 7-1 shows the results for Class A/B shots for the 1-hr and 24-hr averaging times (Scenarios 1A and 2B, respectively). Table 7-2 shows the results for WP shots for the 1-hr and 24-hr averaging times (Scenarios 1B and 2C, respectively). Table 7-3 shows the results for a mix of Class A/B and WP shots for 24-hr and annual averaging periods (Scenarios 2A and 3, respectively).

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Table 7

Comparison of Highest Worst-Case 1-hr and 24-hr Concentrations to the AAAQGs from Class A/B Exposives (Modeling Scenarios 1A and 2B)

Compound ID used in ISCST3[1]	Analyte_Name	Modeling Scenario 1A (Class A/B)			Modeling Scenario 2B (Class A/B)		
		ISC3 Modeled 1-hr Conc. (ug/m3)[2]	1-hr AAAQG (ug/m3)[3]	1-Hr % AAAQG[4]	ISC3 modeled 24-hr Conc. (ug/m3)[2]	24-hr AAAQG (ug/m3)[3]	24-Hr % AAAQG[4]
AB_001	Acetaldehyde	0.00048	2,300	0.0000%	0.00000	1,400	0.0000%
AB_021	Ammonia	0.00048	-	-	0.00000	140	0.0000%
AB_024	Antimony compounds*	0.00058	15	0.0039%	0.00008	4.0	0.0020%
AB_030	Barium compounds	1.97036	15	13.1357%	0.01869	4.0	0.4673%
AB_035	Benzene	0.00347	630	0.0006%	0.00003	51	0.0001%
AB_052	Boron trifluoride	0.06582	-	-	0.00062	23	0.0027%
AB_056	1,3-Butadiene	0.00067	7.2	0.0093%	0.00001	1.9	0.0005%
AB_076	Carbon tetrachloride	0.00004	49	0.0001%	0.00000	13	0.0000%
AB_078	Carbonyl sulfide	0.00026	120	0.0002%	0.00000	40	0.0000%
AB_082	Chlorine	0.13165	69	0.1908%	0.00125	23	0.0054%
AB_086	Chloroform	0.00003	60	0.0001%	0.00000	16	0.0000%
AB_087	Chloromethane (Methyl chloride)	0.00001	36	0.0000%	0.00000	9.5	0.0000%
AB_096	Copper compounds*	0.00250	2.3	0.1087%	0.00002	0.75	0.0027%
AB_120	Dichloromethane (Methylene chloride)	0.00002	7,600	0.0000%	0.00000	2,000	0.0000%
AB_153	Ethylbenzene	0.00086	4,500	0.0000%	0.00001	3,500	0.0000%
AB_161	Fluorine	0.00000	6.0	0.0000%	0.00000	1.6	0.0000%
AB_162	Formaldehyde	0.00048	20	0.0024%	0.00000	12	0.0000%
AB_178	Hexachloroethane	0.00007	300	0.0000%	0.00000	79	0.0000%
AB_179	n-Hexane	0.00026	5,300	0.0000%	0.00000	1,400	0.0000%
AB_180	Hydrogen fluoride	0.02633	562.5	0.0047%	0.00025	187.5	0.0001%
AB_181	Hydrochloric acid	0.33132	210	0.1578%	0.00315	56	0.0056%
AB_182	Hydrogen cyanide	0.00048	40	0.0012%	0.00000	40	0.0000%
AB_183	Hydrogen sulfide	0.01962	180	0.0109%	0.00019	110	0.0002%
AB_199	Lead compounds (inorganic)***	0.72407	-	-	0.00687	-	-
AB_211	Manganese compounds*	11.01470	25	44.0588%	0.10443	8.0	1.3054%
AB_240	Molybdenum trioxide	0.00895	83	0.0108%	0.00008	40	0.0002%
AB_244	Nickel compounds*	0.17773	5.7	3.1181%	0.00169	1.5	0.1127%
AB_246	Nitric acid	0.00096	112.5	0.0009%	0.00001	37.5	0.0000%
AB_258	Ozone**	0.00096	235	0.0004%	0.00001	-	-
AB_315	Styrene	0.00000	3,500	0.0000%	0.00000	1,700	0.0000%
AB_319	Sulfuric acid	0.00006	22.5	0.0003%	0.00000	7.5	0.0000%
AB_324	Tetrachloroethylene (Perchloroethylene)	0.00005	11,000	0.0000%	0.00000	770	0.0000%
AB_334	Toluene	0.00158	4,700	0.0000%	0.00002	3,000	0.0000%
AB_359	Zinc compounds*	0.42567	83	0.5129%	0.00405	40	0.0101%

Notes:

* Metal Compounds: Used Metal AAAQG listed in Table 6-2

** Ozone: Used the NAAQS reference

*** Lead: Used the NAAQS reference

1 Identification used in ISCST3 files for the compounds emitted from the Class A/B Explosives

2 Concentration obtained from the ISCST3 model

3 24-hr and Annual concentration guideline from the AAAQG

4 Calculated by the model concentration divided by the AAAQG concentration

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Table 7-2
Comparison of Highest Worst-Case 1-hr and 24-hr Concentrations
to the AAAQGs from White Phosphorus Explosives (Modeling Scenarios 1B and 2C)

Compound ID used in ISCST3[1]	Analyte Name	Modeling Scenario 1B (WP)			Modeling Scenario 2C (WP)		
		1-hr Conc. (ug/m3)[2]	1-hr AAAQG (ug/m3)[3]	1-Hr % AAAQG[4]	24-hr Conc. (ug/m3)[2]	24-hr AAAQG (ug/m3)[3]	24-Hr % AAAQG[4]
WP_001	Acetaldehyde	0.00044	2300	0.0000%	0.00000	1400	0.0000%
WP_021	Ammonia	0.00000	-	-	0.00000	140	0.0000%
WP_024	Antimony compounds*	0.00156	15	0.0104%	0.00002	4	0.0005%
WP_030	Barium compounds*	0.43211	15	2.8807%	0.00428	4	0.1070%
WP_073	Carbon disulfide	0.00001	91	0.0000%	0.00000	24	0.0000%
WP_076	Carbon tetrachloride	0.00643	49	0.0131%	0.00006	13	0.0005%
WP_078	Carbonyl sulfide	0.00001	120	0.0000%	0.00000	40	0.0000%
WP_082	Chlorine	0.00000	69	0.0000%	0.00000	23	0.0000%
WP_086	Chloroform	0.00001	60	0.0000%	0.00000	16	0.0000%
WP_087	Chloromethane (Methyl chloride)	0.00000	36	0.0000%	0.00000	9.5	0.0000%
WP_092	Chromium (III) Compounds*	0.63867	11	5.8061%	0.00631	3.8	0.1661%
WP_120	Dichloromethane (Methylene chloride)	0.00000	7600	0.0000%	0.00000	2000	0.0000%
WP_162	Formaldehyde	0.00044	20	0.0022%	0.00000	12	0.0000%
WP_178	Hexachloroethane	0.00001	300	0.0000%	0.00000	79	0.0000%
WP_181	Hydrochloric acid	0.00677	210	0.0032%	0.00007	56	0.0001%
WP_182	Hydrogen cyanide	0.00044	40	0.0011%	0.00000	40	0.0000%
WP_183	Hydrogen sulfide	0.00000	180	0.0000%	0.00000	110	0.0000%
WP_199	Lead compounds (inorganic)***	0.22413	-	-	0.00222	-	-
WP_244	Nickel compounds*	0.19231	5.7	3.3739%	0.00190	1.5	0.1267%
WP_246	Nitric acid	0.00044	112.5	0.0004%	0.00000	37.5	0.0000%
WP_258	Ozone**	0.00044	235	0.0002%	0.00000	-	-
WP_273	Phosphoric Acid	0.00434	-	-	0.00004	7.5	0.0005%
WP_319	Sulfuric acid	0.00003	22.5	0.0001%	0.00000	7.5	0.0000%
WP_324	Tetrachloroethylene (Perchloroethylene)	0.00001	11,000	0.0000%	0.00000	770	0.0000%

Notes:

* Metal Compounds: Used Metal AAAQG listed in Table 6-2

** Ozone: Used the NAAQS reference

*** Lead: Used the NAAQS reference

1 Identification used in ISCST3 files for the compounds emitted from WP ordnance

2 Concentration obtained from the ISCST3 model

3 1-hr and 24-hr concentration guideline from the 1992 AAAQGs

4 Calculated by the model concentration divided by the AAAQG concentration

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Table

Comparison of Highest Worst-Case Annual Concentrations
to the AAAQGs from WP and Class A/B Explosives (Modeling Scenarios 2A and 3)

Compound ID used in ISCST3[1]	Analyte Name	Modeling Scenario 2A (Mix)			Modeling Scenario 3 (Mix)		
		24-hr Mix Conc. (ug/m3)[2]	24-hr AAAQG (ug/m3)[3]	24-Hr Mix% AAAQG[4]	Ann. Mix Conc. (ug/m3)[2]	Ann. AAAQG (ug/m3)[3]	Ann. Mix% AAAQG[4]
Mix_001	Acetaldehyde	0.00001	1,400	0.0000%	0.00000	0.50	0.0000%
Mix_021	Ammonia	0.00000	140	0.0000%	0.00000	-	-
Mix_024	Antimony compounds*	0.00002	4	0.0005%	0.00000	-	-
Mix_030	Barium compounds*	0.02265	4	0.5663%	0.00067	-	-
Mix_035	Benzene	0.00003	51	0.0001%	0.00000	0.14	0.0000%
Mix_052	Boron trifluoride	0.00062	23	0.0027%	0.00002	-	-
Mix_056	1,3-Butadiene	0.00001	1.9	0.0005%	0.00000	0.067	0.0000%
Mix_073	Carbon disulfide	0.00000	24	0.0000%	0.00000	-	-
Mix_076	Carbon tetrachloride	0.00006	13	0.0005%	0.00000	0.036	0.0000%
Mix_078	Carbonyl sulfide	0.00000	40	0.0000%	0.00000	-	-
Mix_082	Chlorine	0.00125	23	0.0054%	0.00003	-	-
Mix_086	Chloroform	0.00000	16	0.0000%	0.00000	0.043	0.0000%
Mix_087	Chloromethane (Methyl chloride)	0.00000	9.5	0.0000%	0.00000	0.026	0.0000%
Mix_092	Chromium (III) Compounds*	0.00631	3.8	0.1661%	0.00022	-	-
Mix_096	Copper compounds*	0.00002	0.75	0.0027%	0.00000	-	-
Mix_120	Dichloromethane (Methylene chloride)	0.00000	800	0.0000%	0.00000	2.2	0.0000%
Mix_153	Ethylbenzene	0.00001	3,500	0.0000%	0.00000	-	-
Mix_161	Fluorine	0.00000	1.6	0.0000%	0.00000	-	-
Mix_162	Formaldehyde	0.00001	12	0.0001%	0.00000	0.08	0.0000%
Mix_178	Hexachloroethane	0.00000	79	0.0000%	0.00000	0.34	0.0000%
Mix_179	n-Hexane	0.00000	1,400	0.0000%	0.00000	-	-
Mix_180	Hydrogen fluoride	0.00025	187.5	0.0001%	0.00001	-	-
Mix_181	Hydrochloric acid	0.00321	56	0.0057%	0.00009	7.0	0.0013%
Mix_182	Hydrogen cyanide	0.00001	40	0.0000%	0.00000	-	-
Mix_183	Hydrogen sulfide	0.00019	110	0.0002%	0.00001	-	-
Mix_199	Lead compounds (inorganic)***	0.00894	1.5	0.5960%	0.00027	1.5	0.0180%
Mix_211	Manganese compounds	0.10443	8.0	1.3054%	0.00291	-	-
Mix_240	Molybdenum trioxide	0.00008	40	0.0002%	0.00000	-	-
Mix_244	Nickel compounds*	0.00350	1.5	0.2333%	0.00011	0.004	2.7500%
Mix_246	Nitric acid	0.00001	37.5	0.0000%	0.00000	-	-
Mix_258	Ozone**	0.00001	-	-	0.00000	-	-
Mix_273	Phosphoric Acid	0.00004	7.5	0.0005%	0.00000	-	-
Mix_315	Styrene	0.00000	1,700	0.0000%	0.00000	-	-
Mix_319	Sulfuric acid	0.00000	7.5	0.0000%	0.00000	-	-
Mix_324	Tetrachloroethylene (Perchloroethylene)	0.00000	770	0.0000%	0.00000	2.1	0.0000%
Mix_334	Toluene	0.00002	3,000	0.0000%	0.00000	-	-
Mix_359	Zinc compounds*	0.00405	40	0.0101%	0.00011	-	-

Notes:

* Metal Compounds: Used Metal AAAQG listed in Table 6-2

** Ozone: Used the NAAQS reference

*** Lead: Used the NAAQS Reference

1 Identification used in ISCST3 files for the compounds emitted from Class A/B and WP ordance

2 Concentration obtained from the ISCST3 model

3 24-hr and Annual concentration guideline from the AAAQG

4 Calculated by the model concentration divided by the AAAQG concentration

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Results of the modeling indicate the air quality impacts from operations at the MTR are below the AAAQG levels (or NAAQS levels for ozone and lead) for each of the averaging periods and munitions treatment scenarios. Of the compounds emitted from munitions treatment, based on evaluations conducted for the TRI, a total of 37 compounds were listed as AAAQG compounds.

For the 1-hr averaging period, a maximum 3,000-lb WP or 3,000 lb Class A/B detonation was considered to occur within an hour. The modeling results indicate that the maximum 1-hr impacts occur from the 3,000-lb Class A/B detonation. Of the 37 compounds, 31 have a 1-hr AAAQG from the 3,000-lb Class A/B detonation, for which 28 compounds were indicated to be less than 1% of the AAAQG levels, with the maximum impact at 44% of the AAAQG level from manganese compounds and the second highest impact at 13% of the AAAQG level from barium compounds.

For the 24-hr averaging period, two 3,000-lb Class A/B detonations or two 3,000-lb WP detonations, or a mix of one 3,000-lb Class A/B and one 3,000-lb WP detonations were considered as possible occurrences within a day. The modeling results indicate that the maximum 24-hr impacts occur from the mix scenario of one 3,000-lb Class A/B detonation and one 3,000-lb WP detonation in a day. Of the 37 compounds, 36 have a 24-hr AAAQG. From the mix scenario, 35 of these 36 compounds were indicated to be less than 1% of the AAAQG levels, with the maximum impact at 1.3% of the AAAQG level from manganese compounds and the second highest impact less than 0.6% of the referenced NAAQS level for lead compounds.

For the annual averaging period, a mix of Class A/B and WP detonations (3,000-lbs of each per day over 365 days per year) were modeled. Of the 37 compounds, 13 have an annual AAAQG. The modeling results indicate 12 of these 13 compounds are less than 1% of the AAAQG levels, with the maximum impact at 2.75% of the AAAQG level from nickel compounds and the second highest impact less than 0.02% of the referenced NAAQS level for lead compounds.

A summary of the maximum modeled impacts and locations for each averaging period are provided in Table 7-4. The maximum impacts occurred near the southern perimeter of the secured zone within the tight receptor grid surrounding the MTR, and decrease towards the outer edge of the tight receptor grid. The maximum 1-hr impact occurs approximately 1.60 km due south of the center of the MTR. The maximum 24-hr impact occurs approximately 1.68 km south south west of the center of the MTR. The maximum annual impact occurs approximately 1.63 km south south west of the center of the MTR. The maximum impacts at the nearest residential receptor, located approximately 6 km west north west of the MTR, were also evaluated for each averaging period and are summarized in Table 7-5. As shown in Table 7-5, the maximum impacts from Manganese

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Compounds and Lead Compounds at the nearest residential receptor are less than the AAAQG's for the 1-hour, 24-hour and annual averaging periods.

TABLE 7-4
Summary of Maximum Modeled Impacts

Averaging Period	Compounds with maximum impacts	Maximum Modeled Concentration ($\mu g/m^3$) *	AAAQG Guideline Limit ($\mu g/m^3$) *	Percent of AAAQG	Location (UTM) **
1-hr	Manganese Compounds	11.00	25	44%	732946.75 E*** 3599100.50 N
24-hr	Manganese Compounds	0.105	8.0	1.3%	732446.75 E*** 3599100.50 N
Annual	Nickel Compounds	0.00011	0.004	2.75%	732646.75 E*** 3599100.50 N

* $\mu g/m^3$ = concentration in micrograms per cubic meter
** UTM = Universal Transverse Mercator
*** Maximum impact locations for each averaging period are as follows:
Maximum 1-hr impact is approximately 1.60 km due south of the MTR
Maximum 24-hr impact is approximately 1.68 km due south of the MTR
Maximum annual impact is approximately 1.63 km due south of the MTR

TABLE 7-5
Summary of Maximum Impacts at the Nearest Residential Location*

Averaging Period	Compounds with maximum impact	Maximum Modeled Concentration ($\mu g/m^3$) *	AAAQG Guideline Limit ($\mu g/m^3$) *	% of AAAQG
1-hr	Manganese Compounds	3.14301	25	12.57%
24-hr	Manganese Compounds	0.01309	8.0	0.16%
Annual	Lead Compounds	0.00001	1.5	0.00067%

* The nearest residential location is approximately 6 km west north west of the MTR.
* $\mu g/m^3$ = concentration in micrograms per cubic meter

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8.0 ADDITIONAL IMPACT ANALYSIS

Since this is an AAAQG analysis only, as required by ADEQ, no additional impact analysis (e.g., visibility impact, soils and vegetation impacts) was conducted.

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APPENDIX A

Modeling Protocol Submitted On November 7, 2002

MODELING PROTOCOL
MARINE CORPS AIR STATION
(MCAS) YUMA, ARIZONA

November 7, 2002

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A Modeling Protocol Prepared for:

MCAS Yuma

Submitted to:

Arizona Department of Environmental Quality
Phoenix, Arizona

MODELING PROTOCOL
MARINE CORPS AIR STATION (MCAS)
YUMA, ARIZONA

Kleinfelder Job No: 21089

Prepared by:

V. Kristopher Allen, EIT
Air Quality Project Professional

Reviewed by:

Russell Erbes, CCM
Senior Air Quality Program Manager

KLEINFELDER, INC.
5015 Shoreham Place
San Diego, CA 92122
(858) 320-2019

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EXECUTIVE SUMMARY

The Barry M. Goldwater Range (Goldwater Range) is located in the extreme southwestern portion of Arizona. The Goldwater Range has been operating since 1941 for the training of pilots in aerial and air-to-ground combat. MCAS Yuma, located in Yuma, AZ, operates four ranges on the western third of the Goldwater Range: two manned ranges, an air-to-air gunnery range, and an air combat maneuvering range. MCAS Yuma also operates a Munitions Treatment Range (MTR) near the far western boundary of the Goldwater Range.

The MTR will be regulated under the Resource Conservation and Recovery Act (RCRA) and treats a wide variety of ordnance from different sources. As part of its review of the RCRA Part B permit application for the MTR, the Arizona Department of Environmental Quality (ADEQ) has requested that MCAS Yuma evaluate the potential ambient air quality impact of certain compounds listed in the draft *1999 Update to the Arizona Ambient Air Quality Guidelines (AAAQG)*. These compounds (termed AAAQG compounds) have the potential for direct or indirect health effects if a sensitive person is exposed for a sufficient length of time at a sufficient ambient concentration. This ambient air quality modeling protocol (Protocol) describes how MCAS Yuma intends to conduct the AAAQG impact evaluation. The Protocol follows the ADEQ Modeling Protocol Checklist format, a filled out copy of which is included in Appendix A. This Protocol was prepared on behalf of the MCAS Yuma by Kleinfelder, Inc., under subcontract to the CDM Federal Programs Corporation (CDM).

In order to complete the AAAQG impact evaluation, three major steps are conducted: determine emissions for each AAAQG compound, model the ambient concentrations of each compound at the place where the public could be exposed, and compare the modeled results to the AAAQG concentration for each compound.

In order to estimate emissions, Kleinfelder obtained the record of munitions treated at the MTR for the calendar year 2000 and 2001 and used a Department of Defense (DoD) emissions database to estimate emissions for a hypothetical "worst-case" explosive mix that could be treated at the MTR. This explosive mix was modeled for the anticipated RCRA-permitted conditions of one maximum 3,000-pound net explosive weight (NEW) shot per hour, two shots per day, 365 days per year. The emission estimates are presented in Section 3 of the Protocol. The MTR treats two general categories of munitions: white phosphorous (WP) which is usually used as a smoke generator for marking ordnance drop locations, and Class A/B munitions such as bombs, rockets, ammunition, etc. At MTR, treatment of these two types of munitions occurs separately. Therefore, two separate emission scenarios have to be evaluated, a WP shot and a Class A/B shot.

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In order to conduct the ambient air quality impact modeling, five years of meteorological data from the MCAS Yuma on-site surface (10-meter tower) weather station (the same weather station used by the Yuma International Airport) were obtained as pre-processed (ISC-ready) data from Trinity Consulting. The upper air station used to prepare the ISC-ready data is the Tucson National Weather Service (NWS) station. The most recent five years of data available with the highest data capture rates (years 1993-1997) will be used for modeling. The MCAS Yuma weather station is located about 17 kilometers northwest of the MTR. The terrain near the MTR is extremely flat, although there is a mountain range about 19 kilometers east of the MTR. However, the highest AAAQG impacts are near the MTR, and the mountain range and other complex terrain is not an issue. The topography and meteorological data are discussed in Section 4 of the Protocol.

The standard United States Environmental Protection Agency (USEPA)-approved dispersion model, ISC3 will be used. Regulatory defaults will be selected. One hour, 24-hour, and annual ambient concentrations of AAAQG compounds will be calculated. Since the maximum AAAQG impacts are near the facility, and complex terrain is not an issue, a single fine receptor grid surrounded by a coarse grid will be used in the modeling. MTR operations occur only during daylight and early during the day (0600 to 1400). Therefore, only those hours will be modeled. The modeling procedures are discussed in Section 5 of the Protocol.

The most recent AAAQG compound list published by ADEQ (dated May 11, 1999) will be used for evaluating the AAAQG compound impacts. The methodology for comparing impacts to AAAQGs is discussed in Section 6 of the Protocol.

The AAAQGs represent health-based guidelines that are protective of the most sensitive individuals. These guidelines tend to have lower threshold ambient concentrations for potential health effects than the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. Therefore, this study focuses on AAAQG compounds and AAAQG threshold concentrations.

This Protocol has been developed in an attempt to yield a representative, but conservative worst-case impact assessment. If, after Protocol approval, during preparation of the analysis, it is found that the methodology proposed herein is not representative, ADEQ will be contacted to discuss potential deviations from the methodology contained in the approved Protocol.

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The following contact persons can be used to obtain additional information:

MCAS Yuma	Gil Guillory and Fred Daniel MCAS Yuma Environmental Department Building 228 Yuma, AZ 85369 Telephone (928) 269-2809 Fax (928) 269-5216
CDM Federal Programs	Randa Chichakli CDM Federal Programs 3760 Convoy Street, Suite 210 San Diego, CA 92111 Telephone (858) 268-3383 Fax (858) 268-9677
Kleinfelder, Inc.	Kris Allen Kleinfelder 4815 List Drive, Unit 115 Colorado Springs, CO 80919 Telephone (719) 632-3593 Fax (719) 632-2648

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1.0 INTRODUCTION

1.1 Site Location and Description

The MTR is a fenced, secure square area, approximately 1 kilometer by 1 kilometer and is located approximately near the far western boundary of the Goldwater Range in southwestern Arizona, 12 miles south-southeast of MCAS Yuma, and in Section 33, Township 10S, Range 22W. It is approximately 13 kilometers north of the Arizona/Mexico border and 36 kilometers southeast of the Arizona/California border, approximately 24 kilometers southeast of the town of Yuma, Arizona. Figure 1-1 shows the MTR location.

The site has been closed to the public for more than 40 years and much of the area is undeveloped. The terrain in the immediate vicinity of the MTR is extremely flat and the site elevation is approximately 66 meters above mean sea level (MSL), and generally slopes to the west-northwest at an average grade of 25 feet per mile. No pronounced topographic highs or lows exist. General surface conditions consist of bare ground, with negligible vegetation.

Spent munitions residue from the Yuma segment's four sub-ranges along with munitions from other ranges have been disposed at the MTR. Procedures included open burning and open detonation of explosive ordnances. The MTR includes three separate areas with footprints of between 2,500 and 10,000 square feet; (1) the former Open Burn (OB) Area, (2) the WP Detonation Area and (3) the Class A/B Detonation Area. The OB area was clean-closed under RCRA in 1998, and no open burning occurs at the MTR.

The MTR operates open detonation activities under interim status as a hazardous waste miscellaneous unit (40 Code of Federal Regulations 264.600, Subpart X - Miscellaneous Units). Two primary types of munitions are detonated at the MTR: Class A/B explosives, which are the "traditional" munitions such as bombs, grenades, rifle ammunition, etc., and WP, which is primarily used as a smoke marker for military operations. There are four "shot holes" (1 to 2-meter deep depressions used for detonating munitions) in the Class A/B area, and three shot holes in the WP area. The Universal Transverse Mercator (UTM) coordinates of the MTR and shot holes are shown in Table 1-1. The UTM coordinates are referenced to UTM zone 11 south.

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Table 1-1
MTR and Shot Hole UTM Coordinates

Item	Easting (meters)	Northing (meters)
Northeast MTR Corner	733346	3601236
Southeast MTR Corner	733377	3600211
Northwest MTR Corner	732865	3601213
Southwest MTR Corner	732390	3600188
Class A/B Shot Hole 1	732939	3600732
Class A/B Shot Hole 2	732888	3600679
Class A/B Shot Hole 3	732991	3600636
Class A/B Shot Hole 4	733084	3600671
WP Shot Hole 1	732985	3600139
WP Shot Hole 2	732978	3600153
WP Shot Hole 3	732996	3600173
Approximate Centroid of Class A/B Shot Holes	732986	3600684
Approximate Centroid of WP Shot Holes	732987	3600156

Notes: The above data are approximate to be confirmed during field surveying (GPS) in November, 2002.
Coordinates are provided in NAD 83.

Table 1-1 shows that the Class A/B shot holes are all within 100 to 200 meters of each other, and the WP shot holes are within 20 to 30 meters of each other. Therefore, for modeling purposes, the Class A/B shot holes will be represented by a single UTM coordinate (the approximate centroid), and likewise the WP area will be represented by a single UTM coordinate (the approximate centroid). The Class A/B and WP centroid locations are shown on Figure 1-2.

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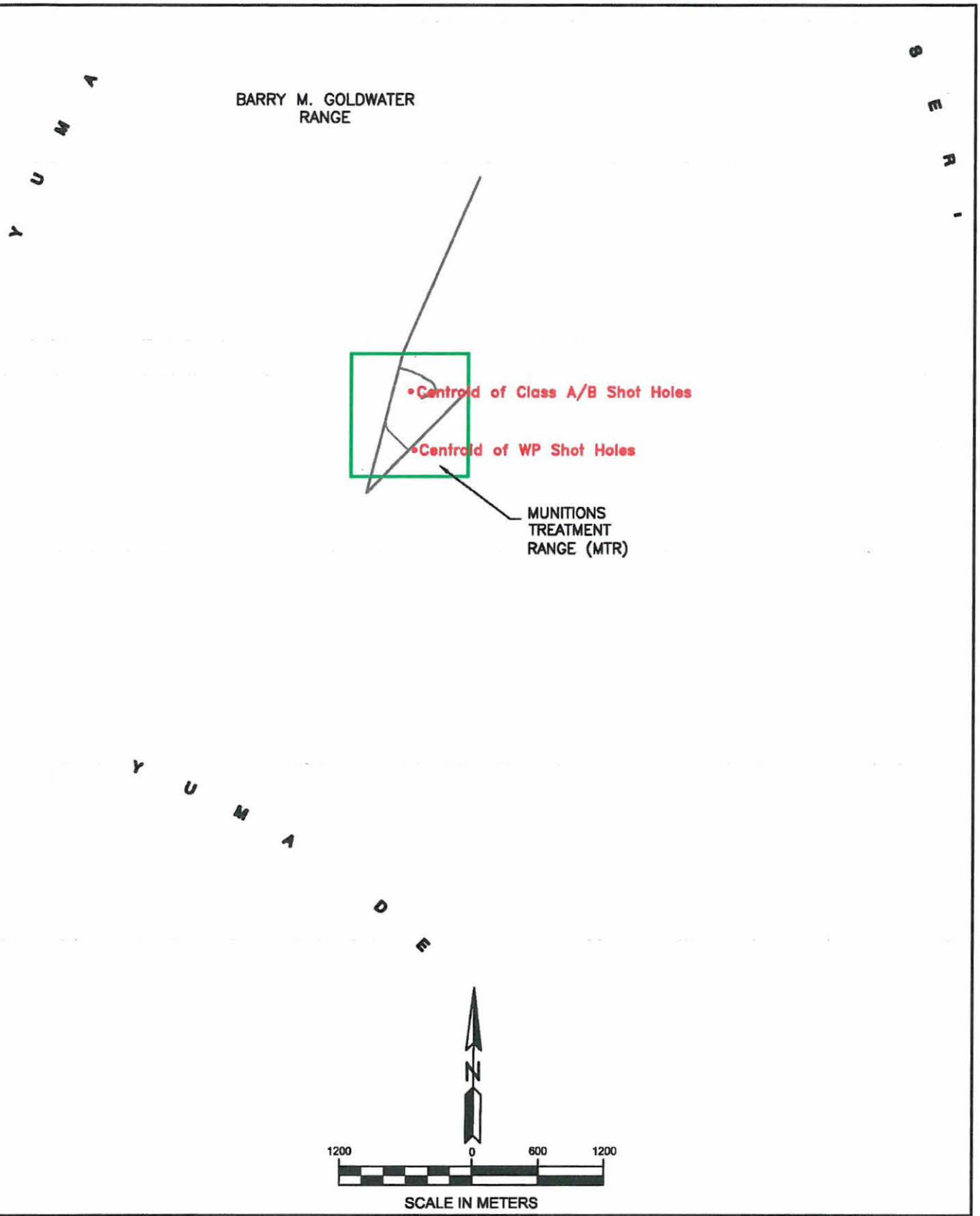
KLEINFELDER 4815 LIST DRIVE, UNIT 115 COLORADO SPRINGS, CO 80919	MCAS YUMA MTR LOCATION BARRY M. GOLDWATER RANGE MCAS YUMA, YUMA, ARIZONA
CHECKED BY: / FN: VICINITY MAP PROJECT NO. 21089 / DATE: 10/02	FIGURE 1 – 1

E:\FIGURES\FIG 1-1 VICINITY MAP.DWG, 10/14/2003 10:50:24 AM



KLEINFELDER 4815 LIST DRIVE, UNIT 115 COLORADO SPRINGS, CO 80919		MCAS YUMA MTR SHOT HOLE LOCATION BARRY M. GOLDWATER RANGE MCAS YUMA, YUMA, ARIZONA	FIGURE 1–2
CHECKED BY:	FN: MTR PLAN		
PROJECT NO. 21089	DATE: 10/02		

E:\FIGURES\FIG 1-2 MTR HOLE LOCATION.DWG, 10/14/2003 10:53:05 AM

1.2 Project History

This Modeling Protocol for the AAAQG impact analysis at MCAS Yuma is being submitted in partial response to the 28 February 2002 draft Second Notice of Deficiency (NOD) to the RCRA Part B Permit Application 1998 Update from ADEQ.

In September 1998, MCAS Yuma submitted a RCRA Part B Permit Application 1998 Update for the Barry M. Goldwater Air Force Range, Arizona. This 1998 application update superseded the two Part B applications previously prepared for the MCAS Yuma and Luke Air Force Base MTR facilities in 1988 and in 1993.

In June 2000, ADEQ issued a draft First NOD to the RCRA Part B Permit Application 1998 Update recommending that MCAS Yuma include a detailed methodology for estimation of emissions, atmospheric, meteorological and topographical characteristics of the MTR and the surrounding area, existing air quality profile, potential impacts to human health and the environment, and a screening assessment.

In response to this First NOD, MCAS Yuma submitted a Response to Comments on 29 August 2001 that included projected emissions from explosives detonation, atmospheric, meteorological and topographical characteristics of the MTR and the Goldwater Range, and air quality information collected in the 1997 Yuma Training Range Complex Final Environmental Impact Statement, which concluded that the ambient air quality at the Goldwater Range (and specifically the MTR) is considered good to excellent.

On 28 February 2002, ADEQ issued a draft Second NOD to the RCRA Part B Permit Application 1998 Update and August 2001 Response to Comments recommending that MCAS Yuma provide a worst case emission inventory, ambient air quality in the immediate vicinity of the MTR, dispersion modeling analysis, and comparison of ambient concentrations to applicable standards.

MCAS Yuma, the Navy, ADEQ, and EPA held a meeting on 17 May 2002 to discuss the issues raised in the Second NOD. As a result of this meeting, a mutually agreeable plan of action was developed for MCAS Yuma's response to ADEQ's comments in the Second NOD. It was agreed that MCAS Yuma would conduct this proposed AAAQG impact analysis and the results will ultimately support the final RCRA Part B Permit for the MTR.

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1.3 Project Purpose

The purpose of this project is to perform a worst-case scenario AAAQG impact analysis to estimate potential impact to the MTR site and surrounding area from MTR operations. Results from this modeling will ultimately support the final RCRA Part B Permit for the MTR.

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2.0 AMBIENT DATA REQUIREMENTS

Consistent with standard ADEQ practice, AAAQG analysis is conducted on a source by source basis and potential background concentrations of AAAQG compounds are not included in an AAAQG analysis. In addition, the MTR is by design located in an isolated, very sparsely populated area, and significant background AAAQG compound concentrations are not expected. Therefore, no background ambient air quality data will be obtained and the AAAQG impact analysis will be based on an isolated source impact analysis.

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3.0 EMISSION INVENTORY

This analysis includes only AAAQG compound emissions. There are two components to the source emission inventory: emission characteristics (e.g., release height) and emission rates (i.e., pounds of AAAQG compound emitted). The emission characteristics will be discussed first.

3.1 Emission Characteristics

The emissions from munitions treatment at MTR are all fugitive emissions resulting from open detonation (OD) of the munitions. No open burning of munitions occurs at MTR. There are two types of open detonation: tamped and untamped. Tamped OD involves placing the munitions in a shot hole and covering it with dirt to reduce the fragmentation pattern of metal components in the detonated munitions. The second type of OD is untamped, where the munitions are placed in a shot hole but not covered with dirt. Untamped detonation is used for smaller munitions/smaller explosive weight detonations and for WP detonations (since WP must be exposed to air in order to achieve desired results).

The MTR is planning to obtain a RCRA permit that allows up to 3,000 pounds of net explosive weight (NEW) to be detonated in a single shot. NEW is the weight of the explosive materials only calculated as the TNT-equivalent weight of the energetic components. The planned RCRA permit will also limit MTR operations to no more than two such shots (i.e., 3,000-pound NEW shots) per day, but allow 365 days per year operation. If the MTR detonates a 3,000-pound NEW shot, logistical and safety demands make it virtually impossible to detonate more than one such shot per hour. It is possible, although rarely -- if ever -- occurs, for the MTR to detonate more than one shot per hour and more than two shots per day if the shots are for NEWs much less than 3,000 pounds. Since the greater the NEW the greater the emissions, for purposes of the hourly AAAQG assessment, a single 3,000-pound NEW shot per hour will be modeled. Since the shot can be either WP or Class A/B, two emission scenarios will be examined for the hourly AAAQG assessment (one Class A/B, and one WP).

As stated, up to two 3,000-pound NEW shots can occur per day. It is possible that both of the 3,000-pound NEW shots are Class A/B or both WP or a mix. Therefore, the following three emission scenarios will be modeled for the 24-hour AAAQG evaluation:

- Two Class A/B shots per day
- One Class A/B and one WP shot per day
- Two WP shots per day

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On an annual basis, there will be a mix of both Class A/B and WP shots. Therefore, for the annual AAAQG assessment, it will be assumed that 365 Class A/B and 365 WP shots occur per year.

Note that the actual number of shots and quantity of explosives detonated over the last several years is much, much less than assumed for these emissions scenarios. A 3,000-pound NEW shot is very rare and two shots per day almost never occur. In addition, MTR detonations actually occur on the order of only about 60 different days per year.

The shots are all detonated at ground level (in the shot holes). However, if a 3,000-pound NEW shot occurs, the energetic materials will cause the emissions to reach a significant height and spread to a significant diameter immediately upon detonation. Therefore, the emissions will be modeled as a "volume" source. MTR staff have observed the initial plume diameter of such large shots (i.e., the 3,000 pound shot) to be on the order of 900 feet (275 meters). Accordingly this dimension (275 meters) will be used as the initial horizontal dimension of the volume source. The MTR has an aviation clearance during MTR operations of 2,000 feet (i.e., no aircraft are allowed lower than 2,000 feet above ground level). If the MTR plans to detonate a 3,000-pound shot, the Federal Aviation Administration (FAA) would be contacted to obtain a greater altitude clearance. However, since the default clearance is 2,000 feet, this height will be used as the initial plume height (i.e., 600 meters). Per standard ISC-modeling procedures, the volume source "release height" for modeling purposes will be set at the mid-point of the volume source height, i.e., 300 meters.

3.2 Emission Estimates

There are thousands of different kinds of munitions that could be treated at the MTR. In addition, there are more than 20 different energetic families (i.e., types of explosives) that the thousands of different munitions can use in widely differing amounts. Finally, the different kinds of munitions contain different non-energetic components that could also be emitted. Therefore, a methodology had to be developed to estimate emissions for the MTR.

The first step in estimating emissions was to obtain an emissions database, developed for the DoD, to estimate emissions from munitions manufacturing, open detonation, and open burning. This database is used by DoD installations as part of their USEPA Toxic Release Inventory (SARA 313) reporting. The database, *Toxics Release Inventory Data Delivery System, TRI-DDS 2000*, published by the URS Corporation in March 2001, was made available to Kleinfelder. The database is an ACCESS-platform database that provides emission estimates in terms of pounds of emissions per item. Each munition in the database is coded by its standard nomenclature, national stock number (NSN) and DoD Identification Code (DODIC). The TRI-DDS includes only

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emissions for TRI compounds. However, most of the AAAQG compounds are TRI compounds and vice versa, so this limitation was not considered serious.

The second step in estimating emissions was to obtain a list of the munitions detonated at the MTR in the calendar years 2000 and 2001. The third step was to access the TRI-DDS and obtain the emissions of TRI compounds (in terms of pounds of emitted compound per item).

There are from 3 to over 30 different AAAQG compounds emitted for each of the different munitions that have been detonated at the MTR. And the emission rate (in terms of pounds of emitted AAAQG compound per item weight and/or pounds of emitted AAAQG compound per net explosive weight) also varies considerably. It is not possible to model each individual munition detonated at MTR (that would be over 115 different munitions for 2000/2001 alone). Likewise, it is not possible to model each of the more than 4,500 different munitions that could be detonated. Therefore, a hypothetical "worst-case" explosive mix and set of emissions for a 3,000-pound NEW shot had to be generated. The following steps were used to generate this worst-case hypothetical explosive mix.

First, the individual emissions for all of the MTR 2000/2001 detonated munitions were combined into a single spreadsheet of emissions (pounds of each AAAQG compound emitted per item). This set of emissions was sorted by AAAQG compound, so that the maximum emission of each AAAQG compound, regardless of the source (i.e., specific munition) of that compound, could be found. That set of maximum emissions was then compiled into a single table, as shown in Table 3-1. Secondly, MCAS Yuma staff were contacted and the NEW for each munition listed in Table 3-1 was obtained. Thirdly, the maximum AAAQG emissions from the listed munitions were scaled-up to represent the maximum theoretical emissions for a 3,000-pound NEW shot, as shown in Table 3-1.

The set of emissions shown in Table 3-1 will then be modeled for each Class A/B shot. In other words, it is assumed that every shot will always be a mix of those munitions that yield the maximum emissions for each AAAQG compound.

Note from Table 3-1 that all of the listed munitions are Class A/B explosives. That is due to the fact that the MTR did not detonate WP during 2000/2001. Therefore, the Table 3-1 data are used only for the Class A/B detonation scenarios. In order to obtain a set of emissions for WP detonation, the TRI-DDS database was queried to identify a representative WP munition, a smoke grenade. Table 3-2 shows the emissions from a smoke grenade and the scale-up to a 3,000-pound NEW white phosphorous shot. It is highly unlikely that the MTR will detonate a 3,000-pound WP shot but, since it is possible, that assumption has been used to model the worst-case WP detonation.

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Table 3-1
Emission Estimates for Worst Case Hypothetical Shot Munition Mix (Class A/B Explosives)

	1	2	3	4	5	6	7	8	9	10
Munition Number	Nomenclature	DODIC	Analyte_Name	Emisson Factor (lbs/item)	NEW (lbs) (Note 1)	NEW (lbs) per 3000 lb NEW Shot	Emissions for One Shot (lbs/shot) (Note 2)	Emissions per Hour (g/s) (Note 3)	Emissions per 24 hr (g/s) (Note 4)	Emissions per Year (g/s) (Note 5)
1	BOMB CLUSTER ANTI-TANK MK20 MOD3	E173	Nickel compounds	1.647E-01	100.0	390.2	6.425E-01	8.10E-02	6.75E-03	6.75E-03
2	BOMB GP 1000LB MK83 MOD4	E507	1,3-Butadiene	6.230E-04	445.0	1,736.4	2.431E-03	3.06E-04	2.55E-05	2.55E-05
	BOMB GP 1000LB MK83 MOD4		Acetaldehyde	4.450E-04	445.0	1,736.4	1.736E-03	2.19E-04	1.82E-05	1.82E-05
	BOMB GP 1000LB MK83 MOD4		Ammonia	4.450E-04	445.0	1,736.4	1.736E-03	2.19E-04	1.82E-05	1.82E-05
	BOMB GP 1000LB MK83 MOD4		Benzene	3.204E-03	445.0	1,736.4	1.250E-02	1.58E-03	1.31E-04	1.31E-04
	BOMB GP 1000LB MK83 MOD4		Carbonyl sulfide	2.384E-04	445.0	1,736.4	9.303E-04	1.17E-04	9.77E-06	9.77E-06
	BOMB GP 1000LB MK83 MOD4		Ethylbenzene	8.010E-04	445.0	1,736.4	3.126E-03	3.94E-04	3.28E-05	3.28E-05
	BOMB GP 1000LB MK83 MOD4		Formaldehyde	4.450E-04	445.0	1,736.4	1.736E-03	2.19E-04	1.82E-05	1.82E-05
	BOMB GP 1000LB MK83 MOD4		Hydrogen cyanide	4.450E-04	445.0	1,736.4	1.736E-03	2.19E-04	1.82E-05	1.82E-05
	BOMB GP 1000LB MK83 MOD4		Hydrogen sulfide	1.818E-02	445.0	1,736.4	7.092E-02	8.94E-03	7.45E-04	7.45E-04
	BOMB GP 1000LB MK83 MOD4		n-Hexane	2.448E-04	445.0	1,736.4	9.550E-04	1.20E-04	1.00E-05	1.00E-05
	BOMB GP 1000LB MK83 MOD4		Nitric acid	8.900E-04	445.0	1,736.4	3.473E-03	4.38E-04	3.65E-05	3.65E-05
	BOMB GP 1000LB MK83 MOD4		Ozone	8.900E-04	445.0	1,736.4	3.473E-03	4.38E-04	3.65E-05	3.65E-05
	BOMB GP 1000LB MK83 MOD4		Sulfuric acid	5.335E-05	445.0	1,736.4	2.082E-04	2.62E-05	2.19E-06	2.19E-06
	BOMB GP 1000LB MK83 MOD4		Toluene	1.468E-03	445.0	1,736.4	5.730E-03	7.22E-04	6.02E-05	6.02E-05
3	GREN HAND SMK HC AN-M8	G930	Chlorine	1.220E-01	1.2	4.7	4.762E-01	6.00E-02	5.00E-03	5.00E-03
	GREN HAND SMK HC AN-M8		Hydrochloric acid	3.072E-01	1.2	4.7	1.199E+00	1.51E-01	1.26E-02	1.26E-02
	GREN HAND SMK HC AN-M8		Zinc compounds	3.946E-01	1.2	4.7	1.540E+00	1.94E-01	1.62E-02	1.62E-02
4	RCKT MTR JATO M8	H330	Molybdenum trioxide	8.295E-03	158.5	618.5	3.237E-02	4.08E-03	3.40E-04	3.40E-04
5	RCKT MTR 5IN MK71 MOD0	J270	Lead compounds (inorganic)	6.720E-01	35.1	137.1	2.622E+00	3.30E-01	2.75E-02	2.75E-02
6	SIGNAL SMK & ILLUM MARINE MK13 MOD0	L275	Antimony compounds	5.373E-04	0.2	0.8	2.097E-03	2.64E-04	2.20E-05	2.20E-05
7	SIGNAL ILLUM GRND PARA RED STAR M126A1	L311	Carbon tetrachloride	4.064E-05	0.3	1.1	1.586E-04	2.00E-05	1.67E-06	1.67E-06
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Chloroform	3.149E-05	0.3	1.1	1.229E-04	1.55E-05	1.29E-06	1.29E-06
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Chloromethane (Methyl chloride)	1.334E-05	0.3	1.1	5.205E-05	6.56E-06	5.47E-07	5.47E-07
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Dichloromethane (Methylene chloride)	2.249E-05	0.3	1.1	8.777E-05	1.11E-05	9.22E-07	9.22E-07
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Hexachloroethane	6.223E-05	0.3	1.1	2.428E-04	3.06E-05	2.55E-06	2.55E-06
	SIGNAL ILLUM GRND PARA RED STAR M126A1		Tetrachloroethylene (Perchloroethylene)	4.385E-05	0.3	1.1	1.711E-04	2.16E-05	1.80E-06	1.80E-06
8	FLARE ACFT PARA YLW M8A1	L388	Barium compounds	1.827E+00	10.3	40.2	7.127E+00	8.98E-01	7.48E-02	7.48E-02
9	FLARE ACFT PARA MK45 MOD0 W/DROGUE TRAY	L426	Fluorine	6.945E-07	16.8	65.7	2.710E-06	3.41E-07	2.85E-08	2.85E-08
	FLARE ACFT PARA MK45 MOD0 W/DROGUE TRAY		Manganese compounds	1.021E+01	16.8	65.7	3.984E+01	5.02E+00	4.18E-01	4.18E-01
10	FLARE, IR CM MJU-7/B	L433	Boron trifluoride	6.105E-02	1.0	3.9	2.382E-01	3.00E-02	2.50E-03	2.50E-03
	FLARE, IR CM MJU-7/B		Hydrogen fluoride	2.442E-02	1.0	3.9	9.529E-02	1.20E-02	1.00E-03	1.00E-03
11	SIMULATOR FLASH ARTY M21	L602	Copper compounds	2.328E-03	0.1	0.4	9.084E-03	1.14E-03	9.54E-05	9.54E-05
12	CHG DEMO BLOCK TNT 1/2LB	M031	Styrene	7.350E-07	0.5	2.0	2.868E-06	3.61E-07	3.01E-08	3.01E-08
			Total NEW (lbs)		**768.8**	**3,000.0**				

Notes:

1. NEW not available for H330, so used item weight. NEW for L433 was listed as zero, so used item weight.
2. Calculated by the ratio of 3000 lb NEW / 768.8.
3. Calculated by Emission/shot * 453.6 g/lb * 1hr / 3600 * 1 shot /hr. Based on one shot per hour.
4. Calculated by Emission/shot * 453.6 g/lb * 1hr / 3600 sec * 2 shots/day * 1 day/24 hr. Based on two shots per day.
5. Calculated by Emission/shot * 453.6 g/lb * 1hr / 3600 sec * 2 shots/day * 365 days/yr * 1 yr / 8760 hrs. Based on two shots per day, 365 days per year.

Table 3-2
Emission Estimates for Worst Case Hypothetical WP Shot

	1	2	3	4	5	6	7	8	9	10
Munition Number	Nomenclature	DODIC	Analyte_Name	Emisson Factor (lbs/item)	NEW (lbs) (Note 1)	NEW (lbs) per 3000 lb NEW Shot	Emissions for One Shot (lbs/shot) (Note 2)	Emissions per Hour (g/s) (Note 3)	Emissions per 24 hr (g/s) (Note 4)	Emissions per Year (g/s) (Note 5)
1	GREEN HAND SMK WP M15	G935	Nickel compounds	4.154E-04	1.9	3,000.0	6.432E-01	8.10E-02	6.75E-03	6.75E-03
	GREEN HAND SMK WP M15		Carbon disulfide	1.746E-08	1.9	3,000.0	2.704E-05	3.41E-06	2.84E-07	2.84E-07
	GREEN HAND SMK WP M15		Acetaldehyde	9.438E-07	1.9	3,000.0	1.461E-03	1.84E-04	1.53E-05	1.53E-05
	GREEN HAND SMK WP M15		Ammonia	7.614E-10	1.9	3,000.0	1.179E-06	1.49E-07	1.24E-08	1.24E-08
	GREEN HAND SMK WP M15		Chromium (III) Compounds	1.379E-03	1.9	3,000.0	2.134E+00	2.69E-01	2.24E-02	2.24E-02
	GREEN HAND SMK WP M15		Carbonyl sulfide	1.378E-08	1.9	3,000.0	2.133E-05	2.69E-06	2.24E-07	2.24E-07
	GREEN HAND SMK WP M15		Phosphoric Acid	9.375E-06	1.9	3,000.0	1.452E-02	1.83E-03	1.52E-04	1.52E-04
	GREEN HAND SMK WP M15		Formaldehyde	9.438E-07	1.9	3,000.0	1.461E-03	1.84E-04	1.53E-05	1.53E-05
	GREEN HAND SMK WP M15		Hydrogen cyanide	9.431E-07	1.9	3,000.0	1.460E-03	1.84E-04	1.53E-05	1.53E-05
	GREEN HAND SMK WP M15		Hydrogen sulfide	7.835E-09	1.9	3,000.0	1.213E-05	1.53E-06	1.27E-07	1.27E-07
	GREEN HAND SMK WP M15		Nitric acid	9.465E-07	1.9	3,000.0	1.466E-03	1.85E-04	1.54E-05	1.54E-05
	GREEN HAND SMK WP M15		Ozone	9.438E-07	1.9	3,000.0	1.461E-03	1.84E-04	1.53E-05	1.53E-05
	GREEN HAND SMK WP M15		Sulfuric acid	5.741E-08	1.9	3,000.0	8.889E-05	1.12E-05	9.33E-07	9.33E-07
	GREEN HAND SMK WP M15		Chlorine	8.720E-09	1.9	3,000.0	1.350E-05	1.70E-06	1.42E-07	1.42E-07
	GREEN HAND SMK WP M15		Hydrochloric acid	1.460E-05	1.9	3,000.0	2.261E-02	2.85E-03	2.37E-04	2.37E-04
	GREEN HAND SMK WP M15		Lead compounds (inorganic)	4.838E-04	1.9	3,000.0	7.491E-01	9.44E-02	7.87E-03	7.87E-03
	GREEN HAND SMK WP M15		Antimony compounds	3.379E-05	1.9	3,000.0	5.232E-03	6.59E-04	5.49E-05	5.49E-05
	GREEN HAND SMK WP M15		Carbon tetrachloride	1.388E-05	1.9	3,000.0	2.149E-02	2.71E-03	2.26E-04	2.26E-04
	GREEN HAND SMK WP M15		Chloroform	1.176E-08	1.9	3,000.0	1.821E-05	2.29E-06	1.91E-07	1.91E-07
	GREEN HAND SMK WP M15		Chloromethane (Methyl chloride)	4.960E-09	1.9	3,000.0	7.680E-06	9.68E-07	8.06E-08	8.06E-08
	GREEN HAND SMK WP M15		Dichloromethane (Methylene chloride)	7.840E-09	1.9	3,000.0	1.214E-05	1.53E-06	1.27E-07	1.27E-07
	GREEN HAND SMK WP M15		Hexachloroethane	2.004E-08	1.9	3,000.0	3.103E-05	3.91E-06	3.26E-07	3.26E-07
	GREEN HAND SMK WP M15		Tetrachloroethylene (Perchloroethylene)	1.388E-08	1.9	3,000.0	2.149E-05	2.71E-06	2.26E-07	2.26E-07
	GREEN HAND SMK WP M15		Barium compounds	9.337E-04	1.9	3,000.0	1.446E+00	1.82E-01	1.52E-02	1.52E-02
			Total NEW (lbs)		**1.9**	**3,000.0**				

Notes:

1. NEW not available for G935. so used item weight.
2. Calculated by the ratio of 3000 lb NEW / 1.9
3. Calculated by Emission/shot * 453.6 g/lb * 1hr / 3600 * 1 shot /hr. Based on one shot per hour.
4. Calculated by Emission/shot * 453.6 g/lb * 1hr / 3600 sec * 2 shots/day * 1 day/24 hr. Based on two shots per day.
5. Calculated by Emission/shot * 453.6 g/lb * 1hr / 3600 sec * 2 shots/day * 365 days/yr * 1 yr / 8760 hrs. Based on two shots per day, 365 days per year.

4.0 TOPOGRAPHY, CLIMATOLOGY, AND METEOROLOGY

4.1 Regional Topography

Figure 1-2 shows that the terrain in the immediate vicinity of the MTR is extremely flat, although the Gila Mountain Range is about 19 kilometers east of the MTR. Since the maximum AAAQG impacts are expected nearest the MTR, the modeling will be conducted in flat terrain mode (i.e., no intermediate or complex terrain needs to be considered).

The land use within a 3-kilometer radius of the MTR is all rural. Therefore, rural dispersion coefficients will be selected for the modeling analysis.

4.2 Regional Climatology

The MTR is located in a classic desert environment, characterized by high temperatures and an unstable atmosphere during the day, and significant radiational cooling and a stable atmosphere at night. However, MTR operations occur only during the early daytime hours (0600 to 1400). Infrequent thunderstorms in the late summer/early fall are the primary source of rainfall in the area.

4.3 Regional Meteorology

Surface meteorological data are measured at two locations in the MTR region: the MCAS Yuma airport (same location as the Yuma International Airport) and the Yuma Proving Ground. The Yuma Proving Ground meteorological station is located on the Goldwater Range near the MTR, however, the data capture statistics for that station are relatively low and the years of data collection relatively incomplete. On the other hand there are complete data available at the MCAS Yuma station (Station 699604). The MCAS Yuma meteorological station is located at 32.65 degrees N, 114.617 degrees West, approximately 17 kilometers northwest of the MTR, with no intervening terrain that would significantly affect the meteorology at the MTR compared to the MCAS Yuma location. Table 4-1 presents the data capture statistics for the MCAS Yuma station since 1992 (2000 and 2001 data are not yet commercially available). As shown in the Table, the most complete five-year period of data is from 1993 to 1997. Therefore, this five-year period will be used for the dispersion modeling surface wind speed, wind direction and temperature. Upper air data will be obtained from the Tucson International Airport station, the nearest upper air station to

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the MTR. The Tucson and MCAS Yuma data will be pre-processed by Trinity Consultants and purchased ISC-ready.

Table 4-1
MCAS Yuma Meteorological Station Data Capture

Year	Hours	Data Capture Percent
2000*	7962	91
1999	8194	94
1998	8396	96
1997	8641	99
1996*	8628	98
1995	8672	99
1994	8727	99
1993	8641	99
1992*	8708	99

* Leap Year

Calm wind speed and direction will be treated with the regulatory default switch setting in the model of "CALM OFF." Missing data will be substituted using the USEPA missing data routines, however, as noted above the data capture is very high and missing data will not be an issue.

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5.0 MODELING ANALYSIS DESIGN

5.1 Model Selection

The ISC3 model will be used for the analysis (current version 02035). The standard DOS-based version available from the USEPA Bulletin Board will be used. Regulatory default settings will be used. Rural dispersion coefficients will be used.

No screening modeling will be conducted, since the meteorological data, emissions data, and receptor set are relatively well determined.

5.2 Receptors

A Cartesian receptor grid will be used for the model plus one discrete receptor, the nearest residence, located approximately 5.9 kilometers northwest of the MTR. The receptor grid will begin 1.6 kilometers from the center of the MTR and consist of receptors spaced every 100 meters out to 2.1 kilometers, and then 500 meters from 2.6 kilometers to 6.6 kilometers from the center of the MTR. If the hot spot is found to be in the coarse grid (i.e., in the distance range of 2.6 kilometers to 6.6 kilometers, which is not expected), a tight receptor grid of 100 meter spacing around the hot spot (500 meters in each direction) will be used to confirm the hot spot location. The center of the MTR is located at approximately 732865 east, 3600929 north UTM Zone 11 (to be confirmed during field surveys in November, 2002). The discrete receptor (nearest residence) is located at 727261 east, 3602670 north UTM Zone 11.

The receptor grid begins 1.6 kilometers (1 mile) from the center of the MTR since the Marines do not allow anyone within a 1-mile radius during a shot. Therefore, no one can be exposed closer than 1.6 kilometers from the MTR. Prior to a shot, the Marines on duty at the MTR perform a visual clearance of the 1-mile radius area to ensure that no one is present.

A receptor elevation of 1.8 meters above ground level will be used; and since the area is all flat terrain, no terrain elevation will be input for the receptors.

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5.3 Building Wake Downwash and GEP

The emissions are all ground-level releases that do not emanate from a stack. In addition, there are no buildings in the MTR area. Accordingly, building wake downwash Good Engineering Practice (GEP) stack height are not relevant.

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6.0 IMPACT ANALYSIS

6.1 AAAQG Analysis

The only analysis to be conducted is to compare the ambient concentrations for each emitted AAAQG compound to the relevant AAAQG concentrations and averaging times. This will be done by running the model using a normalized emission rate (grams per second) and post-processing the resultant ambient concentrations (ug/m3 per 1 gram/second) by multiplying the emission rate for each AAAQG compound in terms of grams per second shown in Tables 3-1 and 3-2 by the normalized ambient concentration.

For a given compound, there are multiple AAAQG averaging times: 1-hour, 24-hour, and annual. In addition the AAAQG references the National Ambient Air Quality Standards (NAAQS) for lead and ozone. The lead NAAQS is in terms of a quarterly average, and the ozone AAAQG is in terms of a 1-hour average. For comparison with the lead NAAQS, it will be assumed that the annual average is equivalent to the quarterly average. Therefore the ISC model will be run for 1-hour, 24-hour, and annual averages. As mentioned previously, the emission scenarios shown in Table 6-1 will be run for the averaging times shown.

Table 6-1
Modeled Emission Scenarios and Averaging Times

Emission Scenario	Emission Assumption	Averaging Times
1A	One 3,000-pound NEW Class A/B shot	1-hour
1B	One 3,000-pound NEW WP shot	1-hour
2A	One 3,000-pound NEW Class A/B shot, One 3,000-pound NEW WP shot	24-hour
2B	Two 3,000-pound NEW Class A/B shots	24-hour
2C	Two 3,000-pound NEW WP shots	24-hour
3	365 Class A/B shots (3,000-pound NEW each) and 365 WP shots (3,000-pound NEW each)	Annual

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6.2 AAAQG Compound Form Compared to Emissions

The TRI-DDS emission database does not precisely match the AAAQGs for metals. This is due to the fact that the TRI-DDS presents a category of metal emissions, e.g., copper compounds, but the AAAQGs are specific, e.g., copper (fume), cuprous chloride, cuprous oxide. When the TRI-DDS emissions are in terms of a metal compound group (e.g., copper compounds), the ambient concentration will be compared to the individual metal AAAQG (e.g., copper fume).

6.3 Other Nearby Sources

AAAQG analyses are source-specific and do not combine impacts with other sources nor background concentrations. In addition, the MTR is in a very isolated area (by design), so it is not expected that there would be a significant AAAQG contribution from background or other nearby sources, and no combined impacts modeling will be conducted.

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7.0 ADDITIONAL IMPACT ANALYSIS

Since this is an AAAQG analysis only as required by ADEQ, no additional impact analysis (e.g., visibility impact, soils and vegetation impacts) will be conducted.

End

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APPENDIX A

ADEQ MODELING PROTOCOL CHECKLIST

MODELING PROTOCOL CONTENTS

ITEM	SECTION NUMBER	NOT INCLUDED	COMMENT
Executive Summary	Exec Summary		
ADEQ Completeness Checklist	Appx. A		
1.0 Introduction	1.0		
1.1 Site Description	1.1		
1.2 Project Description	1.1		
1.3 Application Form		X	AAAQG analysis only (Not part of an air quality permit application).
2.0 Regulatory Status	1.2		
2.1 Source Designation		X	Not an air quality permit application
2.2 Area Classifications		X	Not Applicable (AAAQG analysis only)
2.3 Baseline Dates		X	Not Applicable (AAAQG analysis only)
2.4 Baseline Area		X	Not Applicable (AAAQG analysis only)
2.5 Increment Consumption/expansion		X	Not Applicable (AAAQG analysis only)
3.0 Ambient Data	2.0		
3.1 Pre-App Monitoring		X	Not Applicable (AAAQG analysis only)
3.2 Post-Construction		X	Not Applicable (AAAQG analysis only)
3.3 Meteorological	4.3		
3.4 Background Concentrations	2.0		
4.0 Emission Inventory	3.0		
4.1 Source Emissions Inv	3.1		
4.2 NAAQS Inventory		X	Not Applicable (AAAQG analysis only)
4.3 Increment Inventory		X	Not Applicable (AAAQG analysis only)
4.4 Non-criteria Inv	3.2		
5.0 Topography, Climatology, Meteorology	4.0		
5.1 Regional Topography	4.1		
5.1.1 Simple Terrain	4.1		
5.1.2 Intermediate Terrain	4.1		
5.1.3 Complex Terrain	4.1		
5.2 Regional Climatology	4.2		
5.3 Regional Meteorology	4.3		

5.3.1 Surface Meteorology	4.3		
5.3.1.1 Wind Speed/Direction	4.3		
5.3.1.2 Stability Class	4.3		
5.3.1.3 Data Capture	4.3		
5.3.1.4 Treatment of Calms	4.3		
5.3.2 Upper Air Data	4.3		
6.0 Modeling Analysis Design	5.0		
6.1 Modeling Selection	5.1		
6.1.1 Screen Modeling	5.1		
6.1.2 Refined Screen Modeling	5.1		
6.1.3 Refined Modeling	5.1		
6.2 Model Input Defaults/Options	5.1		
6.3 Rural/Urban Classification	5.1		
6.3.1 Land Use Classification	4.1		
6.3.2. Rural vs. Urban	5.1		
6.4 Receptor Network	5.2		
6.4.1 Coarse Receptors	5.2		
6.4.2 Medium Receptors	5.2		
6.4.3 Fine Receptors	5.2		
6.4.4 Tight Receptors	5.2		
6.4.5 Discrete Receptors	5.2		
6.4.6 Class 1 Receptors		X	Not Applicable (AAAQG analysis only)
6.4.7 Nonattainment Area Boundary Receptors		X	Not Applicable (AAAQG analysis only)
6.5 Receptor Elevation	5.2		
6.6 Source Characterization	3.1		
6.7 Source Locations and Parameters	1.1, 3.1		
6.8 Building Wake Downwash & GEP	5.3		
7.0 Dispersion Modeling Impact Analysis	6.0		
7.1 Preliminary Analysis		X	Not necessary -- emissions and receptors defined
7.1.1 Preliminary Impact Determination		X	Not necessary -- emissions and receptors defined
7.1.2 Sources within Area of Impact	6.2		
7.1.3 Sources Omitted	6.3		
7.1.4 Significant Impacts		X	Not Applicable (AAAQG analysis only)

7.2 Full Impact Analysis			Not Applicable (AAAQG analysis only)
7.2.1 NAAQS Analysis			Not Applicable (AAAQG analysis only)
7.2.2 Increment Analysis			Not Applicable (AAAQG analysis only)
7.2.3 AAAQG Pollutant Analysis	6.1, 6.2		
8.0 Additional Impact Analysis	7.0		
8.1 Growth Analysis		X	Not Applicable (AAAQG analysis only)
8.2 Soils and Vegetation		X	Not Applicable (AAAQG analysis only)
8.3 Visibility Impairment		X	Not Applicable (AAAQG analysis only)
8.3.1 Level 1 Screening		X	Not Applicable (AAAQG analysis only)
8.3.2 Level 2 Screening		X	Not Applicable (AAAQG analysis only)
8.3.3 Level 3 Screening		X	Level 3 not needed based on Level 2 results
8.4 Conclusions		X	Not needed.
9.0 Class 1 Impact Analysis		X	Not Applicable (AAAQG analysis only)
9.1 Class 1 Increments		X	Not Applicable (AAAQG analysis only)
9.2 AQRV		X	Not Applicable (AAAQG analysis only)
9.2.1 Flora & Fauna		X	Not Applicable (AAAQG analysis only)
9.2.2 Water		X	Not Applicable (AAAQG analysis only)
9.2.3. Acid Deposition		X	Not Applicable (AAAQG analysis only)
9.3 Visibility Impact		X	Not Applicable (AAAQG analysis only)
10.0 References		X	Not needed
11.0 Appendices	Appx. A		

APPENDIX B

Response to ADEQ Comments

RESPONSE TO ADEQ COMMENTS

AIR MODELING PROTOCOL
MUNITIONS TREATMENT RANGE
MARINE CORPS AIR STATION YUMA

	COMMENTS	RESPONSES
ADEQ Comments - 31 December 2002		
1.	**Executive Summary. Arizona Ambient Air Quality Guidelines (AAAQGs).** On page ii, it is stated that the 1999 Update AAAQGs will be used during air quality monitoring. Please use the 1992 version of the AAAQGs.	Per ADEQ's request, the 1992 version of AAAQGs will be used.
2.	**Executive Summary. National Ambient Air Quality Standards (NAAQs).** On page ii it is stated that pollutants with NAAQs will not be addressed in air quality modeling. As discussed in the 20 December 2002 conference call, it is a standard protocol to include all contaminants of concern for modeling, to allay the concerns of the public and other environmental groups.	NAAQs are not required per the ADEQ checklist for the Part B Permit. Further, as indicated in the protocol, the AAAQGs are much more stringent than the NAAQs. For example, the annual average AAAQGs range from about 0.001 to 0.0000001 ug/m^3, while the annual average NAAQs for SO_2 is 80 ug/m^3, NO_2 100 ug/m^3. Similar orders of magnitude differences exist for the other NAAQs averaging times (e.g., the CO NAAQs is 10,000 ug/m^3, 8-hour average). Therefore, conducting the analysis only for the AAAQGs will yield results for those chemicals of most concern and with the lowest health-protective thresholds. Existing information from the 1997 Yuma Training Range Complex Final Environmental Impact Statement as presented in the August 2001 Draft Response to Comments will be included in the Part B Permit. Additional information from the 2002 Draft Final Integrated Natural Resource Management Plan will also be submitted in the Part B Permit. This information shows that the MTR region is in attainment with the NAAQQS, including MTR operations, and that a potential NAAQs exceedance is not a concern.

RESPONSE TO ADEQ COMMENTS

AIR MODELING PROTOCOL
MUNITIONS TREATMENT RANGE
MARINE CORPS AIR STATION YUMA

	COMMENTS	RESPONSES
3.	**Executive Summary. Hours of Operation.** ADEQ is satisfied with the projected worst-case scenario. However, ADEQ requires clarification on the actual hours of operation and the hours for which the modeling was performed. The hours of operation, specified on page ii, were 0600 - 1400. Based on these hours, in the winter, the *unlikely* starting hour would be before light. This would translate to a substantial surface inversion that would impede dispersion. If MCAS still plans to operate the MTR before daylight hours, the modeling protocol should reflect this scenario. ADEQ proposes that the operational period be between 1000 to 1500; or for more flexibility from 3 hours after sunrise until 2 hours before sunset.	The MTR will operate during daylight hours. The air model will be run for 0600 to 1400, which may over predict in the winter, but if there is an issue (i.e. concentrations approach an AAAQG) we will adjust the model for the specific day or hour that causes the over-prediction (i.e., remodel the winter day according to actual daylight hours).
4.	**Executive Summary. Meteorological Data.** The authors state that a five-year meteorogical record is available. Will the annual predictions be based on the worst of these five years?	Yes, the annual predictions will be based on the worst of the five years. The current plan is to take the worst hour of any of the five years, the worst day of any of the five years and the worst annual of any of the five years. If this leads to an issue (i.e., concentrations approach an AAAQG), a single worst-case year will be selected for the 1-hour, 24-hour and annual average, based on the year that yields the worst-case annual average concentration.
ADEQ Comment - 21 February 2003		
1.	With reference to the air quality modeling protocol please specify that the operations take place during day light hours.	The revised Air Modeling Protocol specifically states (Executive Summary) "MTR operations occur only during daylight and early during the day (0600 to 1400).

APPENDIX C

Readme File Describing Modeling Files and Disk Containing Modeling Files

MCAS Yuma Readme File

One Hour Impact Analysis

Input File: MCAS1HR.INP
Output File: MCAS1HR.OUT

File Contains:

Class A/B Shot - Modeling Scenario 1A

Class WP Shot - Modeling Scenario 1B

---

24 Hour Impact Analysis

Input File: MCAS24HR.INP
Output File: MCAS24HR.OUT

File Contains:

Mixture of Class A/B and WP Shots - Modeling Scenario 2A

Class A/B Shot - Modeling Scenario 2B

Class WP Shot - Modeling Scenario 2C

Annual Impact Analysis

Input File: MCASSANN.INP
Output File: MCASANN.OUT

File Contains:

Mixture of Class A/B and WP Shots - Modeling Scenario 3

Meteorological Data

File: YUM93_97.ASC

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